Symphonic SYLVANIA

SERVICE MANUAL

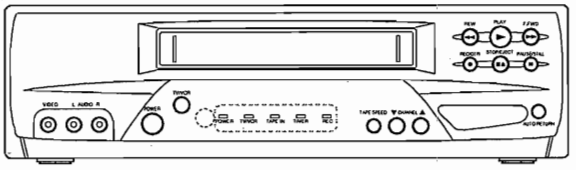
Sec. 1: Main Section
- Specifications
- Preparation for Servicing
- Adjustment Procedures
- Schematic Diagrams
- CBA's

Sec. 2: Deck Mechanism Section
- Standard Maintenance
- Alignment for Mechanism
- Disassembly/Assembly of Mechanism
- Front Loading Assembly
- Alignment Procedures of Mechanism

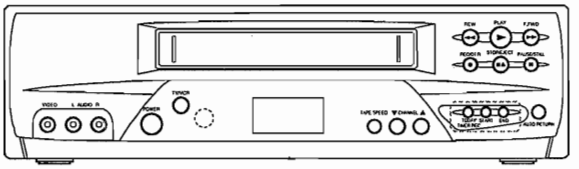
Sec. 3: Exploded views and Parts List Section
- Exploded views
- Parts List

4-Head Hi-Fi VIDEO CASSETTE RECORDER

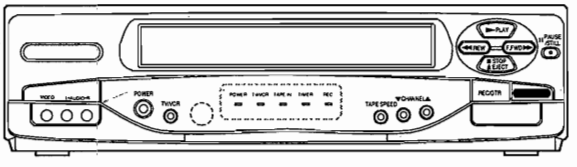
LV446G



LV448HG



SE447SG



VHS

JUN. 18. 1997

IMPORTANT SAFETY NOTICE

Proper service and repair is important to the safe, reliable operation of all Funai Equipment. The service procedures recommended by Funai and described in this service manual are effective methods of performing service operations. Some of these service special tools should be used when and as recommended.

It is important to note that this service manual contains various CAUTIONS and NOTICES which should be carefully read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper service methods may damage the equipment. It also is important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Funai could not possibly know, evaluate and advice the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Funai has not undertaken any such broad evaluation. Accordingly, a servicer who uses a service procedure or tool which is not recommended by Funai must first use all precautions thoroughly so that neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

MAIN SECTION

4-Head Hi-Fi VIDEO CASSETTE RECORDER

LV446G / LV448HG / SE447SG

Sec. 1: Main Section

- **Specifications**
- **Preparation for Servicing**
- **Adjustment Procedures**
- **Schematic Diagrams**
- **CBA' s**

TABLE OF CONTENTS

Specifications 1-1-1
Important Safety Precautions 1-2-1
Standard Notes for Servicing 1-3-1
Preparation for Servicing 1-4-1
Operating Controls and Functions 1-5-1
Cabinet Disassembly Instructions 1-6-1
Electrical Adjustment Instructions 1-7-1
Block Diagrams 1-8-1
Power Supply Trouble Shooting Guide 1-8-13
Function Indicator Symbols 1-8-15
Schematic Diagrams / CBA' s and Test Points 1-9-1
Waveforms 1-10-1
Wiring Diagram 1-11-1
System Control Timing Charts 1-12-1
IC Pin Function Descriptions 1-13-1
Lead Identifications 1-14-1

SPECIFICATIONS

Description	Unit	Minimum	Nominal	Maximum	Condition
1. VIDEO					
1-1 Video Output (PB)	Vp-p	0.8	1.0	1.2	F8-A
1-2 Video Output (R/P)	Vp-p	0.8	1.0	1.2	
1-3 Video S/N Y (R/P)	dB	41	44		SP Mode
1-4 Video Color S/N AM (R/P)	dB	35	44		SP Mode
1-5 Video Color S/N PM (R/P)	dB	33	37		SP Mode
1-6 Resolution (PB)	Line	210	230		F8-M
2. SERVO					
2-1 Jitter Low (R/P)	µsec		0.05	0.1	SP Mode
2-2 Wow & Flutter (R/P) (NORMAL AUDIO)	%		0.2	0.4	SP Mode
3. NORMAL AUDIO					
3-1 Output (PB)	dBV	-10	-6	-2	F8-A
3-2 Output (R/P)	dBV	-10	-6	-2	SP Mode
3-3 S/N	dB	38	43		SP Mode
3-4 Distortion	%		2	4.0	SP Mode
3-5 Freq. resp (R/P) at 200Hz	dB	-6	0		SP Mode
(-20dB ref. 1kHz) at 8kHz	dB	-6	-1.5		SP Mode
4. TUNER (10 ch)					
4-1 Video Output (Color Bar signal with 100% White)	Vp-p	0.8	1.0	1.2	E-E Mode
4-2 Video S/N (S/N Y signal)	dB	40	47		E-E Mode
4-3 Audio Output (1kHz)	dBV	-10	-6	-4	E-E Mode
4-4 Audio S/N (1kHz)	dB	40	46		E-E Mode
5. Hi-Fi AUDIO					
5-1 Output	dBV	-11	-8	-5	F8-HA
5-2 Output	dBV	-11	-8	-5	SP
5-3 Dynamic Range	dB	80	90		SP
5-4 Freq. resp (6dB B.W)	Hz		20~20k		SP

Note: Nominal specs represent the design specs. All units should be able to approximate these – some will exceed and some may drop slightly below these specs. Limit specs represent the absolute worst condition that still might be considered acceptable; In no case should a unit fail to meet limit specs.

IMPORTANT SAFETY PRECAUTIONS

Product Safety Notice

Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by a ⚠ on schematics and in parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. The Product's Safety is under review continuously and new instructions are issued whenever appropriate. Prior to shipment from the factory, our products are carefully inspected to confirm with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

Precautions during Servicing

A. Parts identified by the ⚠ symbol are critical for safety. Replace only with part number specified.

B. In addition to safety, other parts and assemblies are specified for conformance with regulations applying to spurious radiation. These must also be replaced only with specified replacements.

Examples: RF converters, RF cables, noise blocking capacitors, and noise blocking filters, etc.

C. Use specified internal wiring. Note especially:

1) Wires covered with PVC tubing
2) Double insulated wires
3) High voltage leads

D. Use specified insulating materials for hazardous live parts. Note especially:

1) Insulation tape
2) PVC tubing
3) Spacers
4) Insulators for transistors

E. When replacing AC primary side components (transformers, power cord, etc.), wrap ends of wires securely about the terminals before soldering.

F. Observe that the wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).

G. Check that replaced wires do not contact sharp edges or pointed parts.

H. When a power cord has been replaced, check that 5 - 6 kg of force in any direction will not loosen it.

I. Also check areas surrounding repaired locations.

J. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

K. Crimp type wire connector

The power transformer uses crimp type connectors which connect the power cord and the primary side of the transformer. When replacing the transformer, follow these steps carefully and precisely to prevent shock hazards.

Replacement procedure

1) Remove the old connector by cutting the wires at a point close to the connector.

Important: Do not re-use a connector. (Discard it.)

2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

4) Use a crimping tool to crimp the metal sleeve at its center. Be sure to crimp fully to the complete closure of the tool.

L. When connecting or disconnecting the internal connectors, first, disconnect the AC plug from the AC outlet.

Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts, and wires have been returned to their original positions. Afterwards, do the following tests and confirm the specified values to verify compliance with safety standards.

1. Clearance Distance

When replacing primary circuit components, confirm specified clearance distance (d) and (d') between soldered terminals, and between terminals and surrounding metallic parts. (See Fig. 1)

Table 1 : Ratings for selected area

AC Line Voltage	Clearance Distance (d) (d')
120 V	≥ 3.2 mm (0.126 inches)

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

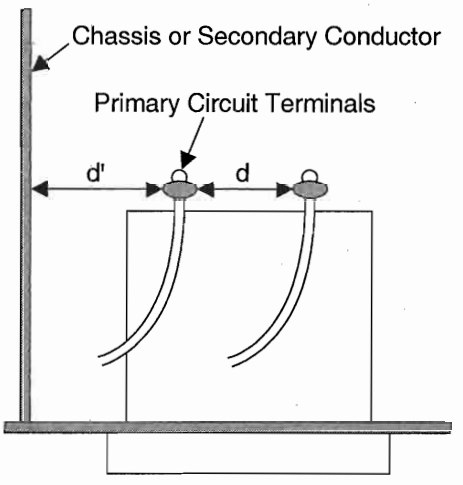


Fig. 1

2. Leakage Current Test

Confirm the specified (or lower) leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.) is lower than or equal to the specified value in the table below.

Measuring Method (Power ON) :

Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across the terminals of load Z. See Fig. 2 and the following table.

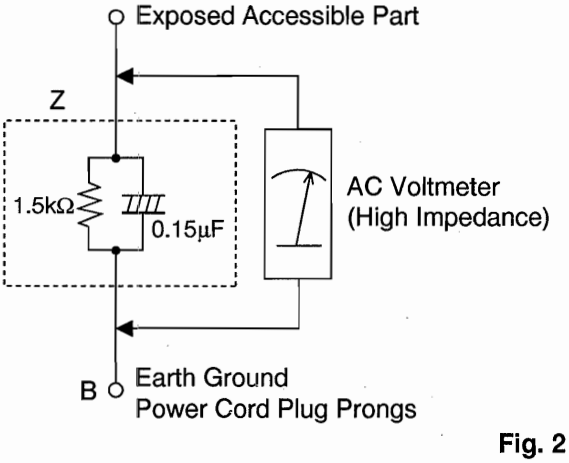


Fig. 2

Table 2 : Leakage current ratings for selected areas

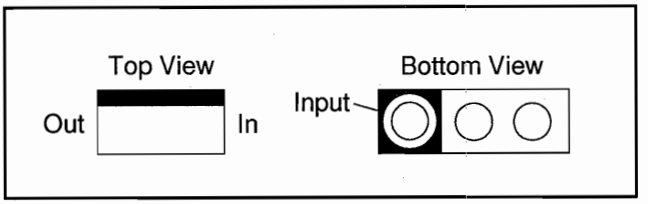
AC Line Voltage	Load Z	Leakage Current (i)	Earth Ground (B) to:
120 V	0.15μF CAP. & 1.5kΩ RES. Connected in parallel	i ≤ 0.5mA rms	Exposed accessible parts

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

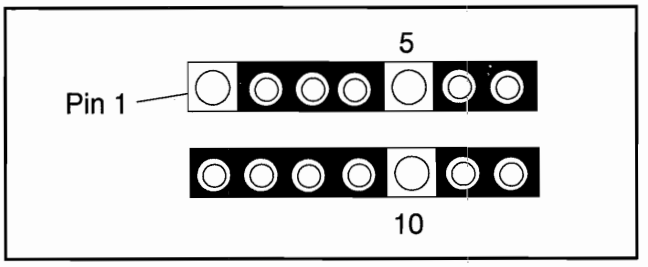
STANDARD NOTES FOR SERVICING

Circuit Board Indications

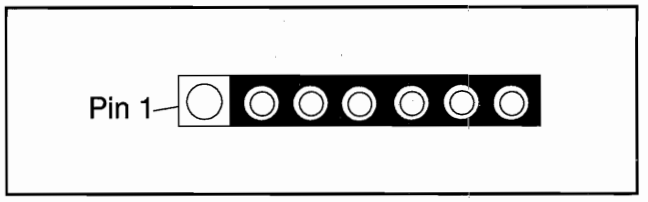
a. The output pin of the 3 pin Regulator ICs is indicated as shown.



b. For other ICs, pin 1 and every fifth pin are indicated as shown.

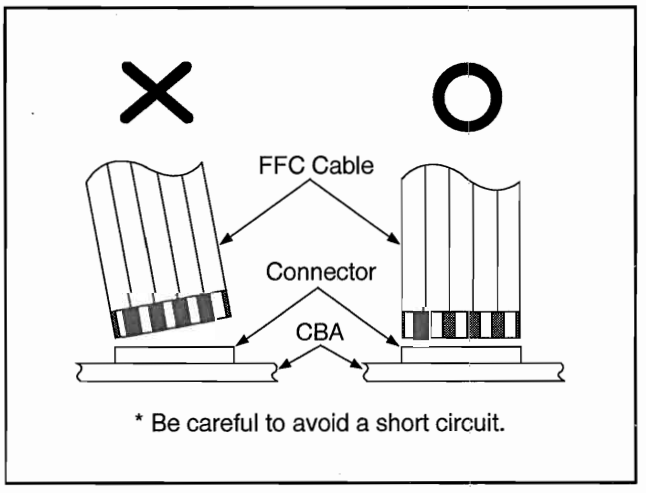


c. The 1st pin of every male connector is indicated as shown.



Instructions for Connectors

1. When you connect or disconnect the FFC (Flexible Foil Connector) cable, be sure to first disconnect the AC cord.
2. FFC (Flexible Foil Connector) cable should be inserted parallel into the connector, not at an angle.



How to Remove / Install Flat Pack-IC

1. Removal

With Hot-Air Flat Pack-IC Desoldering Machine:

(1) Prepare the hot-air flat pack-IC desoldering machine, then apply hot air to the Flat Pack-IC (about 5 to 6 seconds). (Fig. S-1-1)

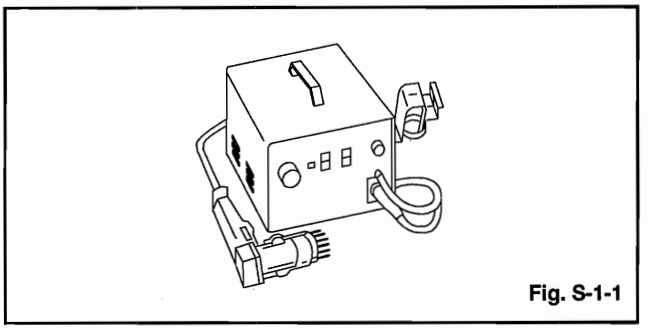


Fig. S-1-1

(2) Remove the flat pack-IC with tweezers while applying the hot air.

(3) Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)

(4) Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

Caution:

1. Do not supply hot air to the chip parts around the flat pack-IC for over 6 seconds because damage to the chip parts may occur. Put masking tape around the flat pack-IC to protect other parts from damage. (Fig. S-1-2)
2. The flat pack-IC on the CBA is affixed with glue, so be careful not to break or damage the foil of each pin or the solder lands under the IC when removing it.

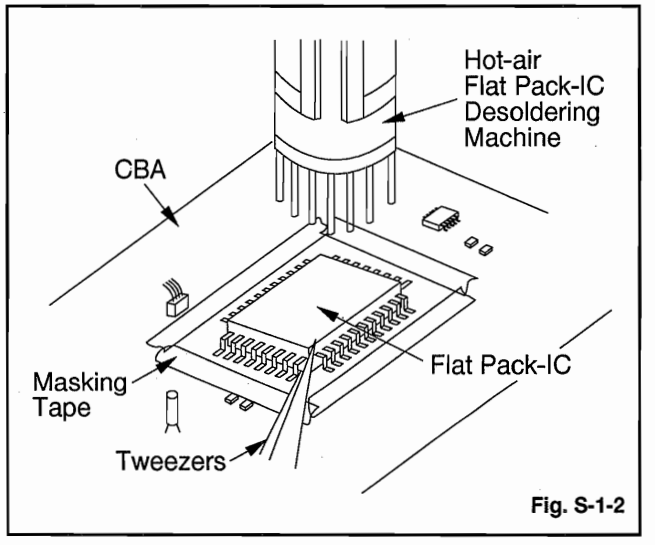


Fig. S-1-2

With Soldering Iron:

(1) Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)

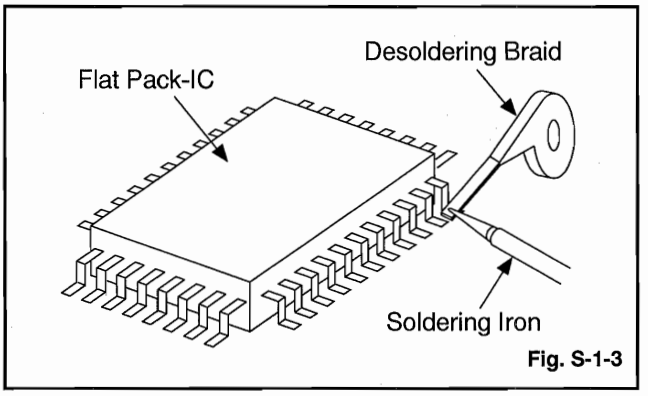


Fig. S-1-3

(2) Lift each lead of the flat pack-IC upward one by one, using a sharp pin or wire to which solder will not adhere (iron wire). When heating the pins, use a fine tip soldering iron or a hot air desoldering machine. (Fig. S-1-4)

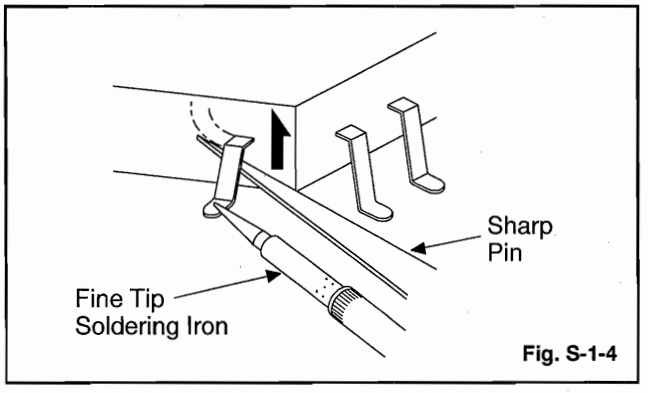


Fig. S-1-4

(3) Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-8)

(4) Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

With Iron Wire:

(1) Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)

(2) Affix the wire to a workbench or solid mounting point, as shown in Fig. S-1-5.

(3) While heating the pins using a fine tip soldering iron or hot air blower, pull up the wire as the solder melts so as to lift the IC leads from the CBA contact pads as shown in Fig. S-1-5.

(4) Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)

(5) Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

Note:

When using a soldering iron, care must be taken to ensure that the flat pack-IC is not being held by glue. When the flat pack-IC is removed from the CBA, handle it gently because it may be damaged if force is applied.

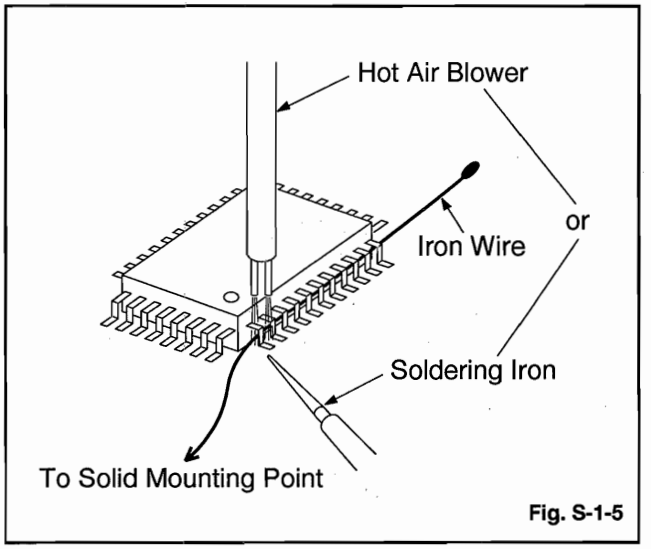


Fig. S-1-5

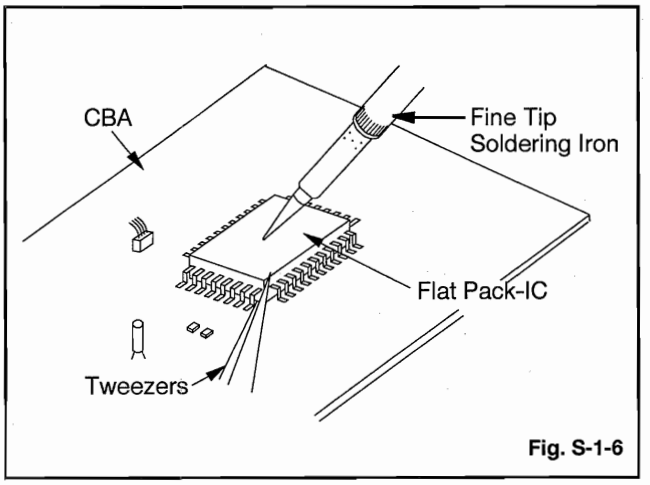


Fig. S-1-6

2. Installation

(1) Using desoldering braid, remove the solder from the foil of each pin of the flat pack-IC on the CBA so you can install a replacement flat pack-IC more easily.

(2) The " ● " mark on the flat pack-IC indicates pin 1. (See Fig. S-1-7.) Be sure this mark matches the 1 on the PCB when positioning for installation. Then pre- solder the four corners of the flat pack-IC. (See Fig. S-1-8.)

(3) Solder all pins of the flat pack-IC. Be sure that none of the pins have solder bridges.

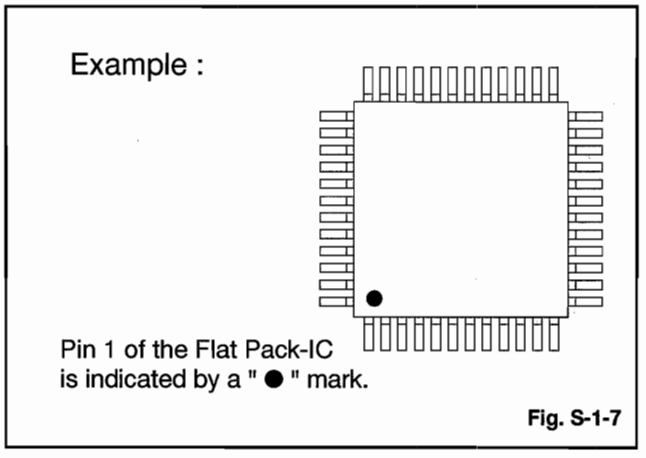


Fig. S-1-7

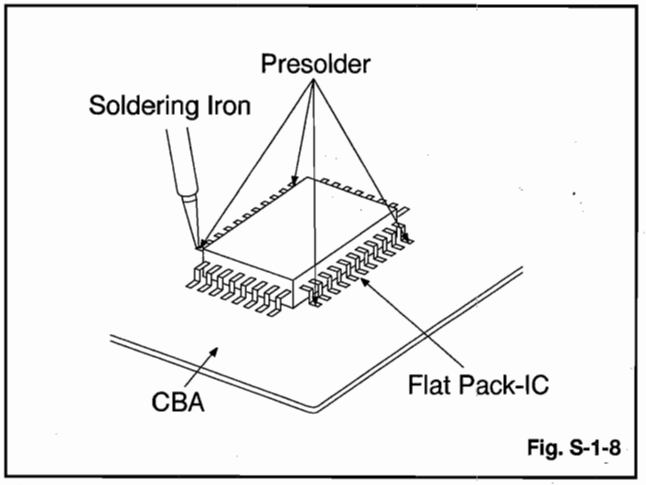


Fig. S-1-8

Instructions for Handling Semiconductors

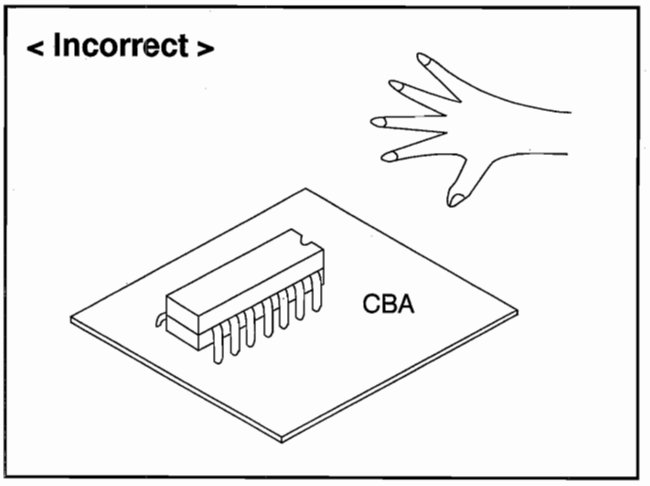
Electrostatic breakdown of the semiconductors may occur due to a potential difference caused by electrostatic charge during unpacking or repair work.

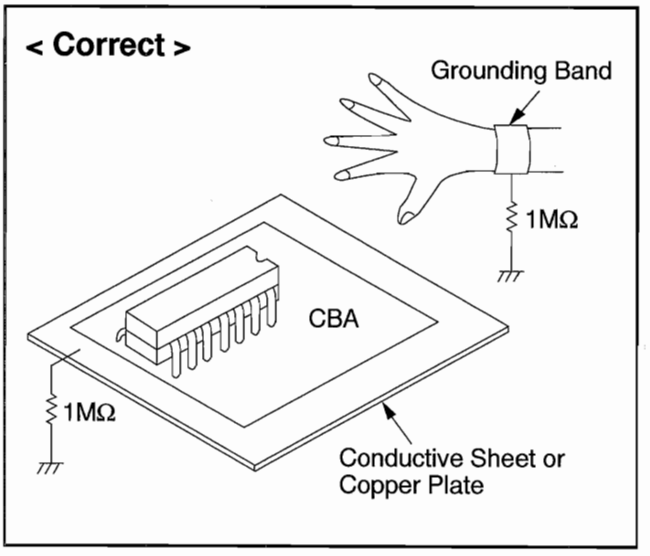
1. Ground for Human Body

Be sure to wear a grounding band (1MΩ) that is properly grounded to remove any static electricity that may be charged on the body.

2. Ground for Workbench

Be sure to place a conductive sheet or copper plate with proper grounding (1MΩ) on the workbench or other surface, where the semiconductors are to be placed. Because the static electricity charge on clothing will not escape through the body grounding band, be careful to avoid contacting semiconductors with your clothing.





PREPARATION FOR SERVICING

How to Use U15 Deck Extension Cable

(1) Remove the Deck Mechanism Assembly. If needed, remove the Main CBA from the chassis. Refer to "Disassembly Instructions" on pg. 1-6-1.

(2) Use the U15 Deck Extension Cable to connect the Deck Mechanism Assembly to the Main CBA. (U15 Deck Extension Cable: N1090XA)

Note: There are 3 types of these connector for the U15 Deck Extension Cable. They are for 2 Head, 4 Head, and Hi-Fi. Use a connector indicated as shown. Be careful not to let the unused connector contact other parts.

Note: Some noise will be present in the playback picture when the extension cable is used.

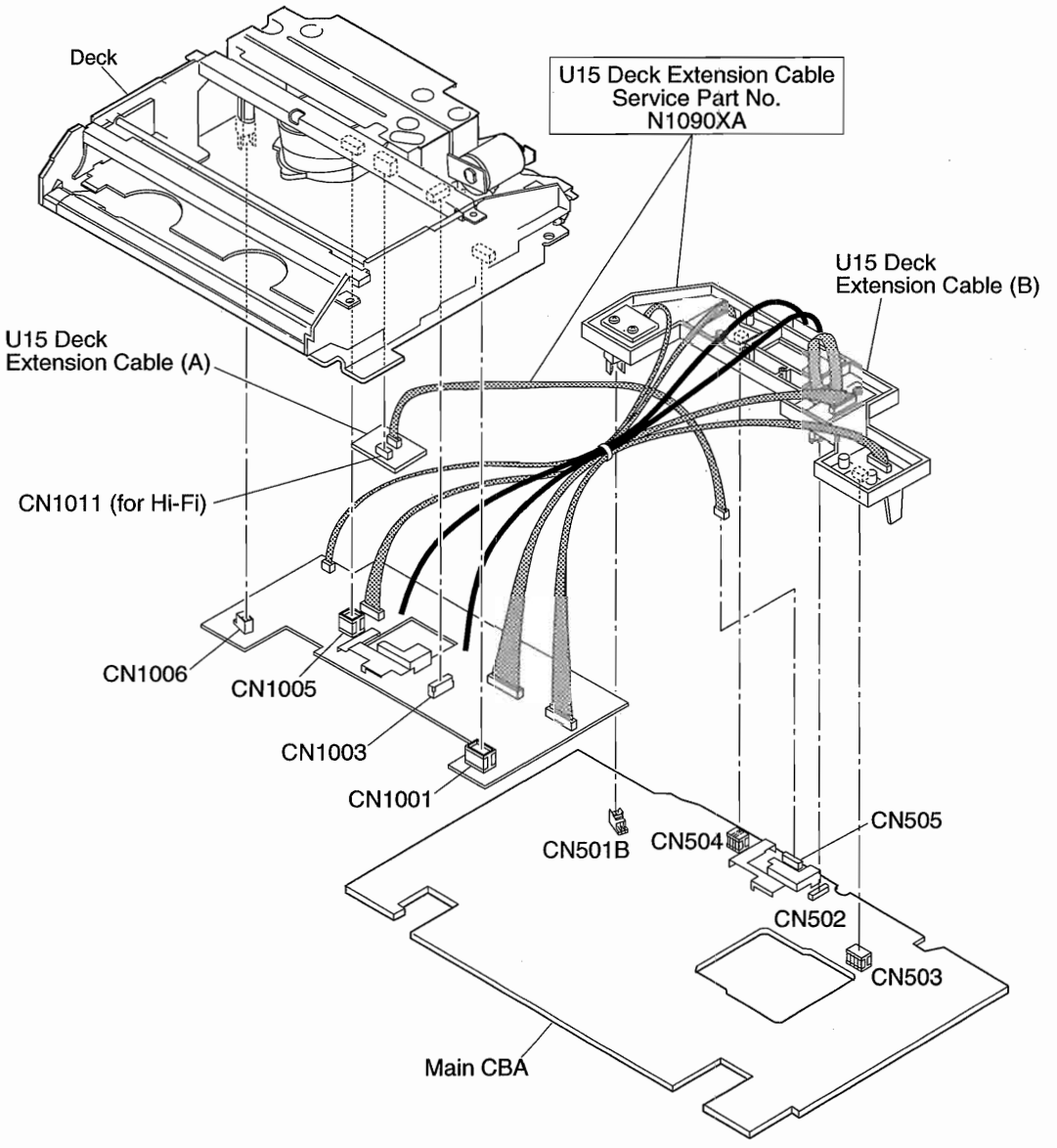


Fig. 1

How to Enter the Service Mode

Note: When the unit is set in the service mode, the display will keep blinking. (**LV448HG**)

About Optical Sensors

Caution:

An optical sensor system is used for the Tape Start and End Sensors on this equipment. Carefully read and follow the instructions below. Otherwise the unit may operate erratically.

What to do for preparation

Insert a tape into the Deck Mechanism Assembly and press the PLAY button. The tape will be loaded into the Deck Mechanism Assembly. Make sure the power is on, connect TP502 (SENSOR INHIBITION) to TP501 (GROUND). This will stop the function of Tape Start Sensor, Tape End Sensor and Reel Sensors. (If these TPs are connected before plugging in the unit, the function of the sensors will stay valid.) See Fig. 2.

Note: Because the Tape End Sensors are inactive, do not run a tape all the way to the start or the end of the tape to avoid tape damage.

About REC-Safety Switch

Caution:

The REC-Safety Switch is directly mounted on the Main CBA. When the Deck Mechanism Assembly is removed from the Main CBA for servicing, this switch does not work automatically.

What to do for preparation

In order to record, press the Rec button while pushing REC-SAFETY SW on the Main CBA. See Fig. 2.

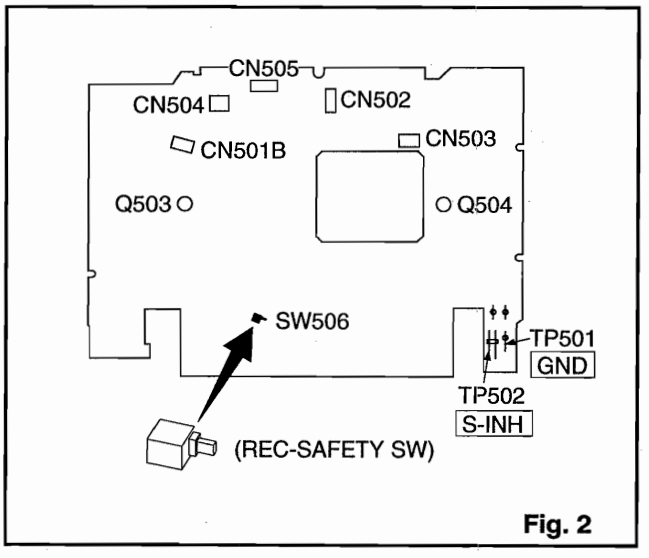
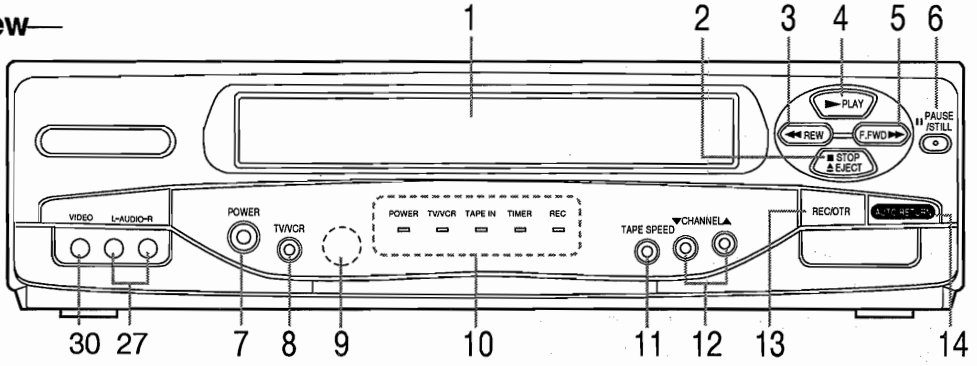


Fig. 2

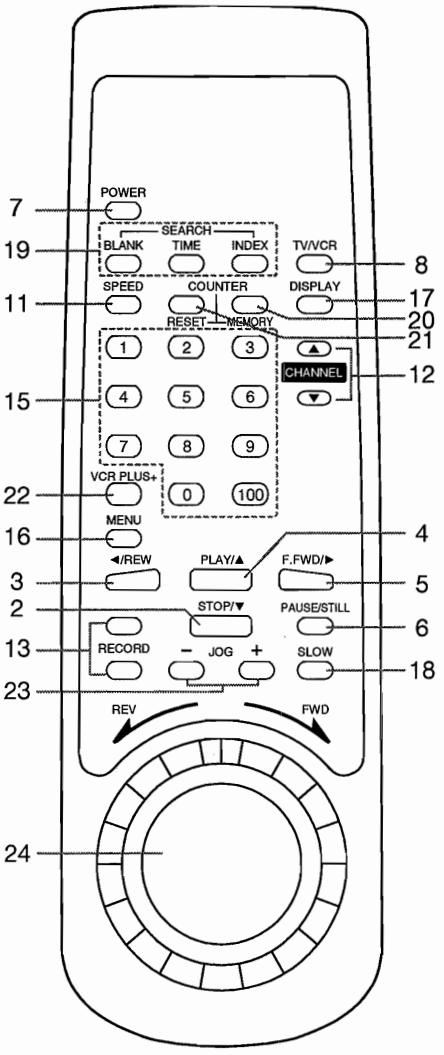
OPERATING CONTROLS AND FUNCTIONS

Model No, : SE447SG

—Front View—



—Remote Control View—



Part No, : UREMT36AL002

1. **Cassette Compartment**

2. **STOP button–** Press to stop the tape motion.

   EJECT button– Press to remove a tape from the VCR. (only on the VCR)

   ▼ button– Press to enter digits when setting program (for example: setting clock or timer program). Press to select setting modes from on screen menu. (only on the remote control)

3. **REW button–** Press to rewind the tape, or to view the picture rapidly in reverse during the playback mode. (Rewind Search)

   ◄ button– Press to cancel a setting of timer program. Press to correct digits when setting program (for example: setting clock or timer program). (only on the remote control)

4. **PLAY button–** Press to begin playback.

   ▲ button– Press to enter digits when setting program (for example: setting clock or timer program). Press to select setting modes from on screen menu. (only on the remote control)

5. **F.FWD button–** Press to rapidly advance the tape, or view the picture rapidly in forward during playback. (Forward Search)

   ► button– When setting program (for example: setting clock or timer program), press to determine your selection and proceed to a next step you want to input. Press to determine setting modes from on screen menu. (only on the remote control)

6. **PAUSE/STILL button–**

   Press to temporarily stop the tape during recording or to view a still picture during playback.

   Frame Advance function–

   Press to advance the picture by one frame during the still mode.

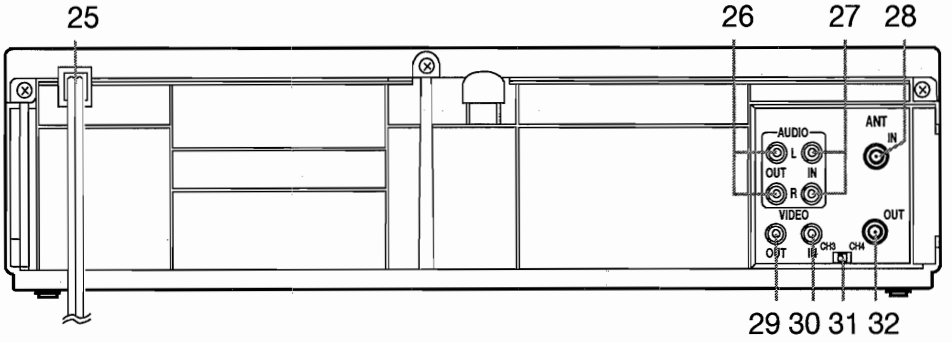
7. **POWER button–**

   Press to turn VCR on and off. Press to activate a timer recording.

8. **TV/VCR button–** Press to select TV or VCR mode.

   VCR position: to view playback, to monitor video recordings or watch TV using the VCR tuner.

—Rear View—



TV position: to watch TV or to view one program while recording another.

9. **Remote sensor window–** Receives the infrared signals from the remote control.

10. **Indicators**

POWER indicator– Indicates that the power is turned on.

TV/VCR indicator– Indicates that the VCR is in the VCR position.

TAPE IN indicator– Indicates that there is a tape in the VCR.

TIMER indicator– Indicates that a timer recording or OTR has been set.

REC indicator– Indicates that a recording is occurring. It flashes when a recording has been paused.

11. **TAPE SPEED button–** Press to set desired recording speed : SP/LP/SLP.

12. **CHANNEL buttons–** Press to select desired channels for viewing or recording.

Tracking function– Press to minimize video 'noise' (lines or dots on screen) during playback (only on the VCR) or slow mode.

Press to stabilize the picture in the Still mode when the picture begins to vibrate vertically.

13. **RECORD button–** Press to begin manual recording.
When you operate by remote control, press both buttons (1 is a safety button) together.

OTR button– Press to activate One Touch Recording. (only on the VCR)

14. **AUTO RETURN button–** Press to rewind to the beginning of a timer recording. (only on the VCR)

15. **NUMBER buttons–** Press to select desired channels for viewing or recording. To select channels from 1 to 9, first press "0" button then 1 to 9.

100 button– When selecting cable channels which are more than 100, press this button first, then press the last two digits. (To select channel 125, first press "100" button then press "2" and "5").

16. **MENU button–** Press to display menus on the TV screen. (only on the remote control)

17. **DISPLAY button–** Press to display the remain, the counter, or the current channel number and current time on the TV screen. (only on the remote control)

18. **SLOW button–** Press to reduce the playback speed. Slow speed can be controlled by pressing F.FWD button (faster) or REW button (slower).

19. **SEARCH buttons**

BLANK SEARCH button– Press to use Blank Search mode.

TIME SEARCH button– Press to use Time Search mode.

INDEX SEARCH– Press to use Index Search mode.

20. **COUNTER MEMORY button–** Press to set counter memory on and off.

21. **COUNTER RESET button–** Press to reset counter to 0:00:00. Press to add or delete channel numbers during channel preset.

22. **VCR PLUS+ button–** Press to program the automatic timer recording using the VCR Plus+ system.

23. **JOG buttons–** Press to advance one frame in the forward or backward direction.

24. **Shuttle Ring–** Turn to make rewind or fast forward speed faster in the forward or backward direction in the Play mode or Still mode. The further the Shuttle Ring is rotated, the faster the playback speed.

25. **Power cord–** Connect to a standard AC outlet (120V/60Hz).

26. **AUDIO OUT jacks–** Connect to the audio input jacks of your audio equipment or another VCR.

27. **AUDIO IN jacks–** Connect to the audio output jacks of your audio equipment or another VCR.

28. **ANT. IN terminal–** Connect to an antenna or CATV.

29. **VIDEO OUT jack–** Connect to a video input jack of your video camera or another VCR.

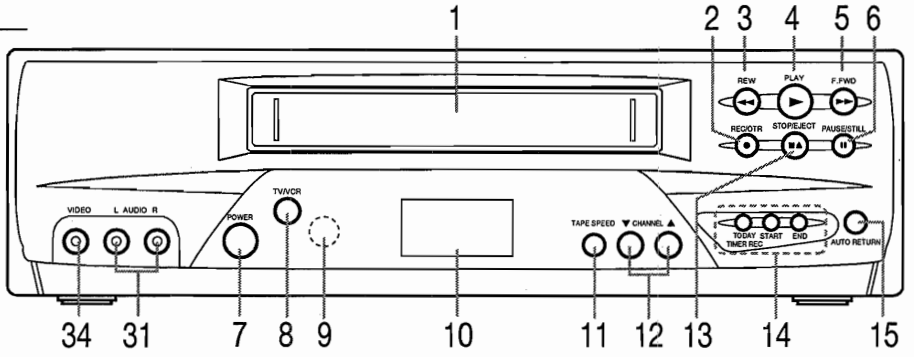
30. **VIDEO IN jack–** Connect to a video output jack of your video camera or another VCR.

31. **CH3/CH4 selector switch–** Use to select a video output channel (3 or 4) for playback from the VCR.

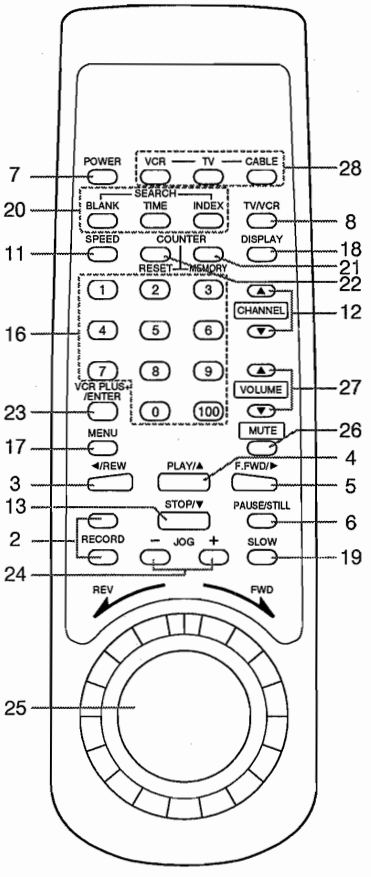
32. **ANT. OUT terminal–** Connect to an antenna input terminal of your TV.

Model No, : LV448HG

—Front View—



—Remote Control View—



Part No, : UREMT39AL003

1. **Cassette Compartment**
2. **RECORD button–** Press to begin manual recording. When you operate by remote control, press both buttons (1 is a safety button) together.

   OTR button– Press to activate One Touch Recording. (only on the VCR)
3. **REW button–** Press to rewind the tape, or to view the picture rapidly in reverse during the playback mode. (Rewind Search)

   ◄ button– Press to cancel a setting of timer program. Press to correct digits when setting program (for example: setting clock or timer program). (only on the remote control)
4. **PLAY button–** Press to begin playback.

   ▲ button– Press to enter digits when setting program (for example: setting clock or timer program). Press to select setting modes from on screen menu. (only on the remote control)
5. **F.FWD button–** Press to rapidly advance the tape, or view the picture rapidly in forward during playback. (Forward Search)

   ► button– When setting program (for example: setting clock or timer program), press to determine your selection and proceed to a next step you want to input. Press to determine setting modes from on screen menu. (only on the remote control)
6. **PAUSE/STILL button–** Press to temporarily stop the tape during recording or to view a still picture during playback.

   Frame Advance function– Press to advance the picture by one frame during the still mode.
7. **POWER button–** Press to turn VCR on and off. Press to activate a timer recording.
8. **TV/VCR button–** Press to select TV or VCR mode.

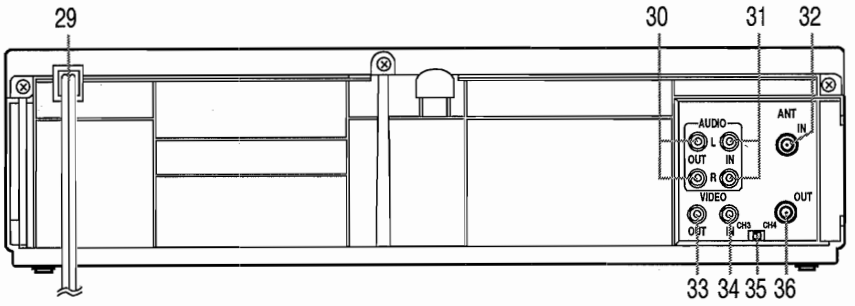
   VCR position: to view playback, to monitor video recordings or watch TV using the VCR tuner.

   TV position: to watch TV or to view one program while recording another.
9. **Remote sensor window–** Receives the infrared signals from the remote control.
10. **Digital display**
11. **TAPE SPEED button–** Press to set desired recording speed : SP/LP/SLP.
12. **CHANNEL buttons–** Press to select desired channels for viewing or recording.

    Tracking function– Press to minimize video 'noise' (lines or dots on screen) during playback (only on the VCR) or slow mode.

    Press to stabilize the picture in the Still mode when the picture begins to vibrate vertically.

—Rear View—



13. **STOP button–** Press to stop the tape motion.

    EJECT button– Press to remove a tape from the VCR. (only on the VCR)

    ▼ button– Press to enter digits when setting program (for example: setting clock or timer program). Press to select setting modes from on screen menu. (only on the remote control)

14. **TODAY TIMER REC button–** Press to set a today timer program, or to check it. (only on the VCR)

    START button– Press to enter desired start time during today timer setting.

    END button–Press to enter desired end time during today timer setting.

15. **AUTO RETURN button–** Press to rewind to the beginning of a timer recording. (only on the VCR)

16. **NUMBER buttons–** Press to select desired channels for viewing or recording. To select channels from 1 to 9, first press "0" button then 1 to 9.

    100 button– When selecting cable channels which are more than 100, press this button first, then press the last two digits. (To select channel 125, first press "100" button then press "2" and "5").

17. **MENU button–** Press to display menus on the TV screen. (only on the remote control)

18. **DISPLAY button–** Press to display the remain, the counter, or the current channel number and current time on the TV screen. (only on the remote control)

19. **SLOW button–** Press to reduce the playback speed. Slow speed can be controlled by pressing F.FWD button (faster) or REW button (slower).

20. **SEARCH buttons**

    BLANK SEARCH button– Press to use Blank Search mode.

    TIME SEARCH button– Press to use Time Search mode.

    INDEX SEARCH– Press to use Index Search mode.

21. **COUNTER MEMORY button–** Press to set counter memory on and off.

22. **COUNTER RESET button–** Press to reset counter to 0:00:00. Press to add or delete channel numbers during channel preset.

23. **VCR PLUS+ button–** Press to program the automatic timer recording using the VCR Plus+ system.

    ENTER button– Press to memorize the number corresponding to the brand of your TV as shown in the owner's manual. For example, If you have an RCA TV, press 0, then 8 button. then, press the ENTER button.

24. **JOG buttons–** Press to advance one frame in the forward or backward direction.

25. **Shuttle Ring–** Turn to make rewind or fast forward speed faster in the forward or backward direction in the Play mode or Still mode. The further the Shuttle Ring is rotated, the faster the playback speed.

26. **MUTE button–** Press to mute the TV's sound. Press it again to resume the sound.

27. **VOLUME buttons–** Press to adjust the desired TV's volume level by using either ▲ or ▼ button.

28. **VCR/TV/CABLE buttons–** Press to select TV, VCR or Cable mode.

    VCR position: to operate the VCR or watch TV using the VCR tuner.

    TV position: to watch TV or to view one program while recording another.

    Cable position: Press to operate the cable converter box. When it has capability of operation with this remote control.

29. **Power cord–** Connect to a standard AC outlet (120V/60Hz).

30. **AUDIO OUT jacks–** Connect to the audio input jacks of your audio equipment or another VCR.

31. **AUDIO IN jacks–** Connect to the audio output jacks of your audio equipment or another VCR.

32. **ANT. IN terminal–** Connect to an antenna or CATV.

33. **VIDEO OUT jack–**Connect to a video input jack of your video camera or another VCR.

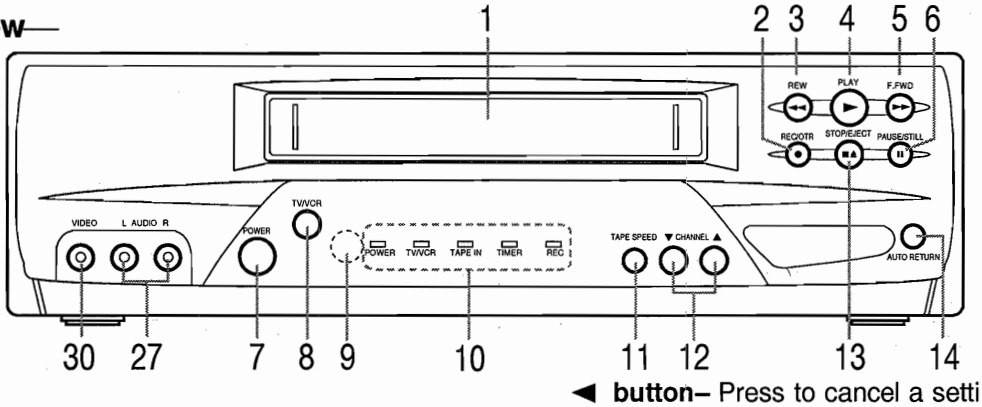
34. **VIDEO IN jack–**Connect to a video output jack of your video camera or another VCR.

35. **CH3/CH4 selector switch–** Use to select a video output channel (3 or 4) for playback from the VCR.

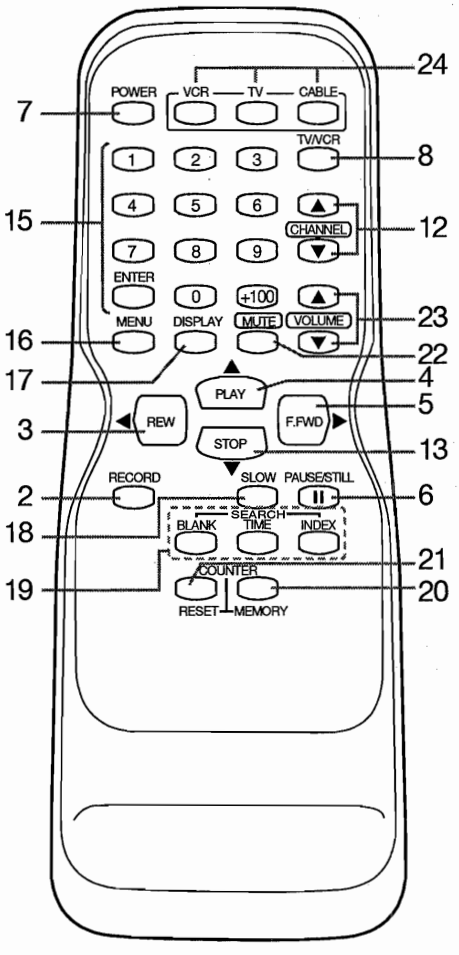
36. **ANT. OUT terminal–** Connect to an antenna input terminal of your TV.

Model No, : LV446G

—Front View—



—Remote Control View—



Part No, : N9287UD

1. **Cassette Compartment**
2. **RECORD button–**Press to begin manual recording.

   OTR button–Press to activate One Touch Recording. (only on the VCR)
3. **REW button–** Press to rewind the tape, or to view the picture rapidly in reverse during the playback mode. (Rewind Search)

   ◄ button– Press to cancel a setting of timer program. Press to correct digits when setting program (for example: setting clock or timer program). (only on the remote control)
4. **PLAY button–** Press to begin playback.

   ▲ button– Press to enter digits when setting program (for example: setting clock or timer program). Press to select setting modes from on screen menu. (only on the remote control)
5. **F.FWD button–** Press to rapidly advance the tape, or view the picture rapidly in forward during playback. (Forward Search)

   ► button– When setting program (for example: setting clock or timer program), press to determine your selection and proceed to a next step you want to input. Press to determine setting modes from on screen menu. (only on the remote control)
6. **PAUSE/STILL button–** Press to temporarily stop the tape during recording or to view a still picture during playback.

   Frame Advance function– Press to advance the picture by one frame during the still mode.
7. **POWER button–** Press to turn VCR on and off. Press to activate a timer recording.
8. **TV/VCR button–** Press to select TV or VCR mode.

   VCR position: to view playback, to monitor video recordings or watch TV using the VCR tuner.

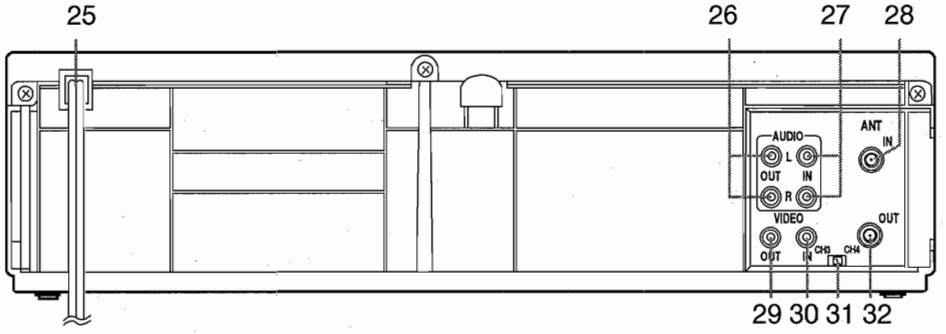
   TV position: to watch TV or to view one program while recording another.
9. **Remote sensor window–** Receives the infrared signals from the remote control.
10. **Indicators**

    POWER indicator– Indicates that the power is turned on.

    TV/VCR indicator– Indicates that the VCR is in the VCR position.

    TAPE IN indicator– Indicates that there is a tape in the VCR.

—Rear View—



TIMER indicator– Indicates that a timer recording or OTR has been set.

REC indicator– Indicates that a recording is occurring. It flashes when a recording has been paused.

11. **TAPE SPEED button–** Press to set desired recording speed : SP/LP/SLP.
12. **CHANNEL buttons–** Press to select desired channels for viewing or recording.

    Tracking function– Press to minimize video 'noise' (lines or dots on screen) during playback (only on the VCR) or slow mode. Press to stabilize the picture in the Still mode when the picture begins to vibrate vertically.
13. **STOP button–** Press to stop the tape motion.

    EJECT button– Press to remove a tape from the VCR. (only on the VCR)

    ▼ button–Press to enter digits when setting program (for example: setting clock or timer program). Press to select setting modes from on screen menu. (only on the remote control)
14. **AUTO RETURN button–** Press to rewind to the beginning of a timer recording. (only on the VCR)
15. **NUMBER buttons–** Press to select desired channels for viewing or recording. To select channels from 1 to 9, first press "0" button then 1 to 9.

    +100 button– When selecting cable channels which are more than 100, press this button first, then press the last two digits. (To select channel 125, first press "+100" button then press "2" and "5").

    ENTER button– Press to memorize the number corresponding to the brand of your TV as shown in the owner's manual. For example, If you have an RCA TV, press 0, then 8 button. then, press the ENTER button.
16. **MENU button–** Press to display menus on the TV screen. (only on the remote control)
17. **DISPLAY button–** Press to display the remain, the counter, or the current channel number and current time on the TV screen. (only on the remote control)
18. **SLOW button–** Press to reduce the playback speed. Slow speed can be controlled by pressing F.FWD button (faster) or REW button (slower).
19. **SEARCH buttons**

    BLANK SEARCH button– Press to use Blank Search mode.

    TIME SEARCH button– Press to use Time Search mode.

    INDEX SEARCH– Press to use Index Search mode.
20. **COUNTER MEMORY button–** Press to set counter memory on and off.
21. **COUNTER RESET button–** Press to reset counter to 0:00:00. Press to add or delete channel numbers during channel preset.
22. **MUTE button–** Press to mute the TV's sound. Press it again to resume the sound.
23. **VOLUME buttons–** Press to adjust the desired TV's volume level by using either ▲ or ▼ button.
24. **VCR/TV/CABLE buttons–** Press to select TV, VCR or Cable mode.

    VCR position: to operate the VCR or watch TV using the VCR tuner.

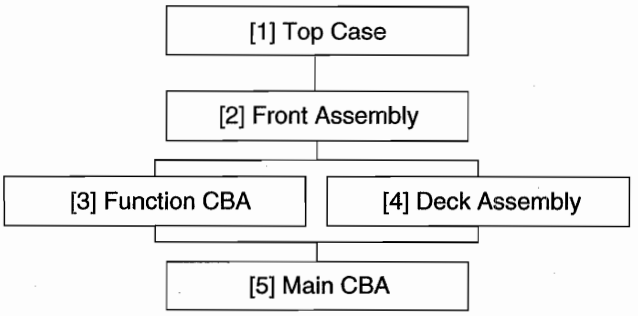
    TV position: to watch TV or to view one program while recording another.

    Cable position: Press to operate the cable converter box. When it has capability of operation with this remote control.
25. **Power cord–** Connect to a standard AC outlet (120V/60Hz).
26. **AUDIO OUT jacks–** Connect to the audio input jacks of your audio equipment or another VCR.
27. **AUDIO IN jacks–** Connect to the audio output jacks of your audio equipment or another VCR.
28. **ANT. IN terminal–** Connect to an antenna or CATV.
29. **VIDEO OUT jack–** Connect to a video input jack of your video camera or another VCR.
30. **VIDEO IN jack–** Connect to a video output jack of your video camera or another VCR.
31. **CH3/CH4 selector switch–** Use to select a video output channel (3 or 4) for playback from the VCR.
32. **ANT. OUT terminal–** Connect to an antenna input terminal of your TV.

CABINET DISASSEMBLY INSTRUCTIONS

1. Disassembly Flowchart

This flowchart indicates the disassembly steps to gain access to item(s) to be serviced. When reassembling, follow the steps in reverse order. Bend, route, and dress the cables as they were originally.



Disassembly Method

ID/ LOC. No.	PART	REMOVAL		
		Fig. No.	REMOVE/ *UNHOOK/UNLOCK/ RELEASE/UNPLUG/ DESOLDER	Note
[1]	Top Case	1	3(S-1)	-
[2]	Front Assembly	2, 3	*7(L-1)	1
[3]	Function CBA	2, 4	*(L-2), (CN507)	2
[4]	Deck Assembly	5	7(S-2), (CN501B, CN502, CN503, CN504, CN505)	3
[5]	Main CBA	4, 6	3(S-3), *(L-3)	4
↓ ①	↓ ②	↓ ③	↓ ④	↓ ⑤

①: Identification (location) No. of parts in the figures

②: Name of the part

③: Figure Number for reference

④: Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.
P=Spring, L=Locking Tab, S=Screw,
CN=Connector
*=Unhook, Unlock, Release, Unplug, or Desolder
e.g. 2(S-2) = two Screws (S-2),
2(L-2) = two Locking Tabs (L-2)

⑤:Refer to "Reference Notes."

Reference Notes

CAUTION: Locking Tabs (L-1) are fragile. Be careful not to break them.

1. Release 7 Locking Tabs (L-1). To do this, first release three Locking Tabs (A) at the bottom, and then four Locking Tabs (B) at the top. (Fig. 2, 3)
2. Disconnect Connector (CN507) to remove Function CBA. Hold Main CBA while pulling up Function CBA. (Fig. 4)
3. Remove 7 Screws (S-2). Then slowly lift Deck Assembly up. Lifting Deck Assembly disconnects 5 Connectors (CN501B, CN502, CN503, CN504, CN505). (Fig. 5)
4. Always reinstall screws (S-3) when reassembling the unit. These screws are critical for proper shielding of the Main CBA.

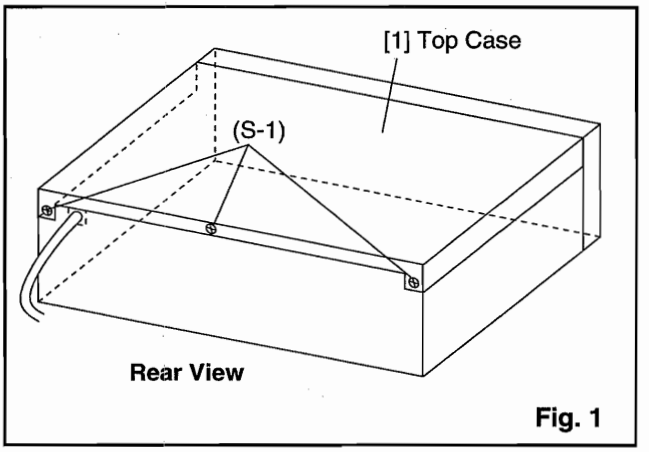


Fig. 1

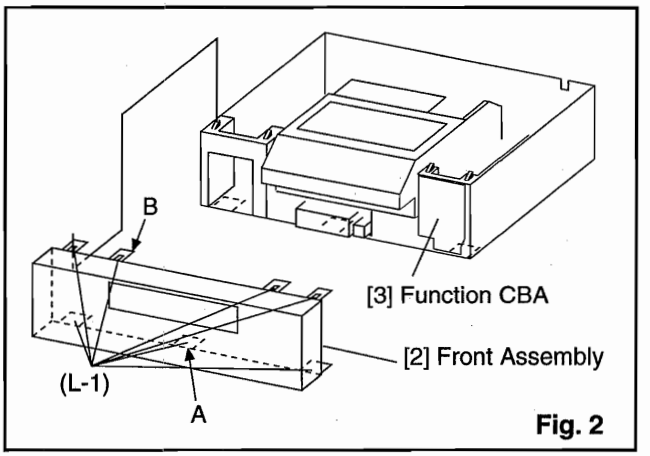


Fig. 2

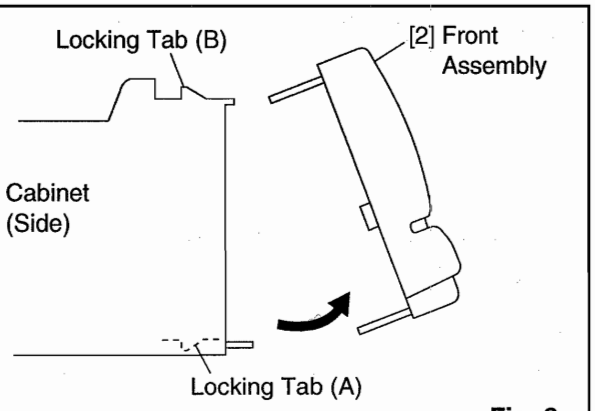


Fig. 3

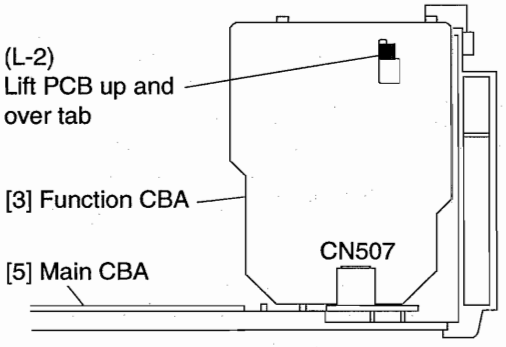


Fig. 4

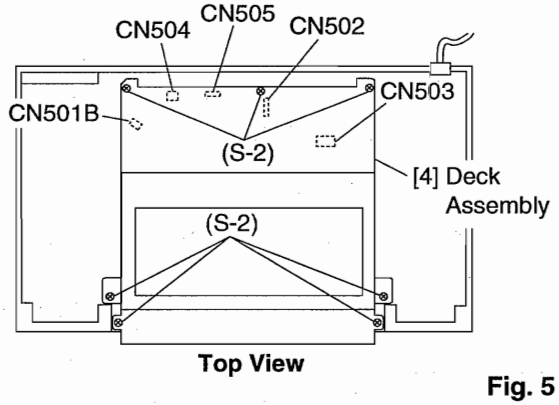


Fig. 5

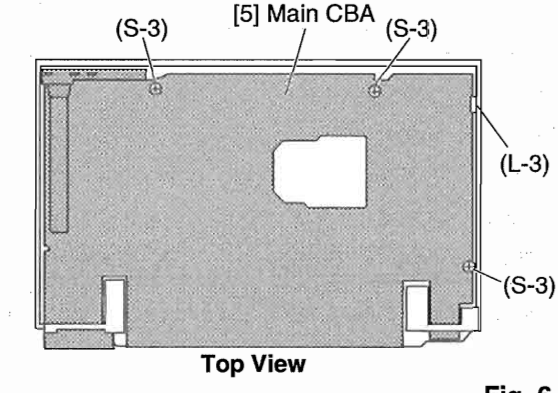


Fig. 6

ELECTRICAL ADJUSTMENT INSTRUCTIONS

General Note: "CBA" is an abbreviation for "Circuit Board Assembly."

Notes:

1. Electrical adjustments are required after replacing circuit components and certain mechanical parts. It is important to do these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.
2. To perform these alignment / confirmation procedures, make sure that the tracking control is set in the center position: Press both CHANNEL "UP" and "DOWN" buttons at the same time (VCR's Front Panel only).

Test Equipment Required

1. Oscilloscope: Dual-trace with 10:1 probe, V-Range: 0.001~50V/Div., F-Range: DC~AC-20MHz
2. NTSC Pattern Generator (color bar with 100% white)
3. Frequency Counter
4. Audio Generator
5. USA TV Multi Channel Sound Generator
6. TV Modulator
7. TV UP Converter
8. Video Pattern Generator
9. Alignment Tape (FL8A)
10. Blank Tape (Available Locally)
11. TV Monitor

1. Head Switching Position Adjustment

Purpose:

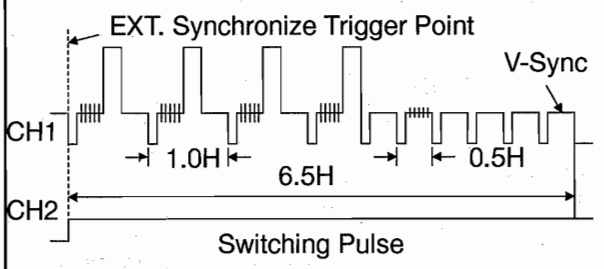
To determine the Head Switching point during playback.

Symptom of Misadjustment:

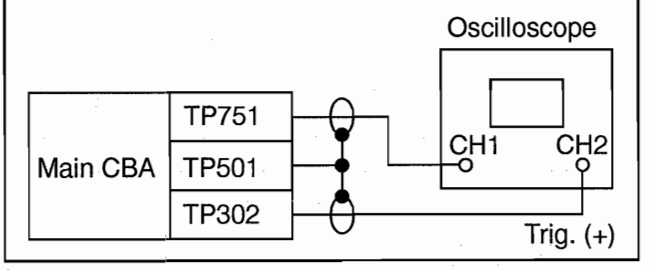
May cause Head Switching noise or vertical jitter in the picture.

Test Point	Adj. Point	Mode	Input
TP751(V-OUT) TP302(RF-SW) TP501(GND)	VR501 (Switching Point)	PLAY (SP)	----
Tape	**Measurement Equipment**	**Spec.**	
FL8A	Oscilloscope	6.5H±1H (412.7μs±60μs)	

Figure 1



Connections of Measurement Equipment



Reference Notes:

TP302, TP751, VR501: Main CBA

1. Play back the test tape and adjust VR501 so that the V-sync front edge of the CH1 video output waveform is at the 6.5H(412.7μs) delayed position from the rising edge of the CH2 head switching pulse waveform.

2. FM Audio Carrier Frequency Adjustment

Purpose:

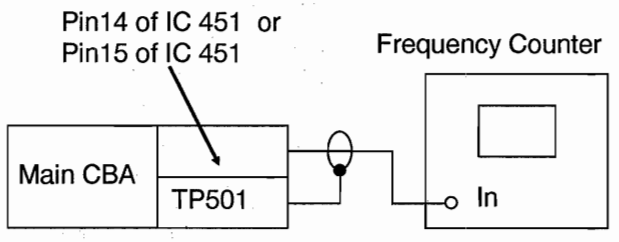
To set the FM audio carrier frequency to the optimum level.

Symptom of Misadjustment:

Cannot playback Hi-Fi audio signal correctly which is recorded on the tape by another VCR, and vice-versa.

Test Point	Adj. Point	Mode	Input
Pin14 of IC 451 Pin15 of IC 451 TP501 (GND)	VR451, VR452 (CAR) (Hi-Fi Audio CBA)	E-E	—
Tape	**Measurement Equipment**	**Spec.**	
—	Frequency Counter	1300±10kHz 1700±10kHz	

Connections of Measurement Equipment



Reference Notes:

TP501: Main CBA
IC451, VR451, VR452: Hi-Fi Audio CBA

1.7MHz Adjustment

1. Connect the Frequency Counter between Pin14 of IC 451 and TP501(GND).
2. Connect PCB jumper between Pin15 of IC 451 and +5V Line.
3. Adjust VR451 so that the frequency of the Rch becomes 1700±10kHz.

1.3MHz Adjustment

4. Connect the Frequency Counter between Pin14 of IC 451 and TP501(GND).
5. Connect a 10k ohm (1/4W) resistor between Pin15 of IC 451 and +5V line.
6. Adjust VR452 so that the frequency of the Lch becomes 1300±10kHz.

3. Stereo/SAP Filter/VCO/MTS/ Separation Adjustment

3A. Stereo/SAP Filter Adjustment

Purpose:

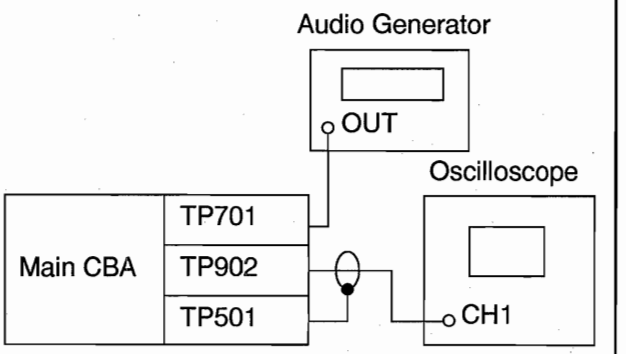
To set the carrier of Stereo/SAP detection filter properly.

Symptom of Misadjustment:

Can't receive Stereo and SAP broadcast.

Test Point	Adj. Point	Mode	Input
TP701(MPX) TP902 (FILTER) TP501(GND)	VR952(FILTER) (Hi-Fi Audio CBA)	E-E	22.9kHz 100mVrms (283mVp-p)
Tape	**Measurement Equipment**	**Spec.**	
—	Audio Generator/ Oscilloscope	Minimum Level	

Connections of Measurement Equipment



Reference Notes:

TP701, TP501 : MAIN CBA
TP902, VR952 : Hi-Fi Audio CBA

1. Receive a stereo broadcasting station using the tuner.
2. Remove VR701(Center pin) from the Main CBA and input 22.9kHz, 100mVrms (283mVp-p) from the audio generator to TP701.

   After completing Section 3 A, B, and C Adjustments, re-install VR701(Center pin).
3. Adjust VR952 so that the output level becomes minimum.

Note:

After this adjustment, be sure to do the VCO and MTS Block Separation adjustments.

3B. VCO Adjustment

Purpose:

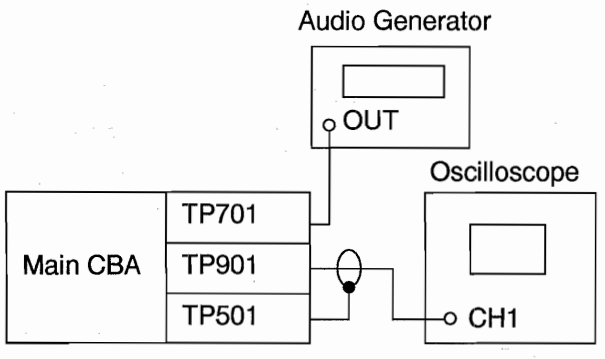
To adjust the reference signal of Stereo/SAP carrier properly.

Symptom of Misadjustment:

Can't receive Stereo and SAP broadcast.

Test Point	Adj. Point	Mode	Input
TP701(MPX) TP901(VCO) TP501(GND)	VR953(VCO) (Hi-Fi Audio CBA)	E-E	15.734kHz, 49mVrms (139mVp-p)
Tape	**Measurement Equipment**	**Spec.**	
—	Audio Generator/ Oscilloscope	—	

Connections of Measurement Equipment



Reference Notes:

TP701, TP501: MAIN CBA
TP901, VR953 : Hi-Fi Audio CBA

1. Set the oscilloscope to DC input mode and set voltage range as high as possible so that the waveform is at the center of picture.
2. Input 15.734kHz, 49mVrms (139mVp-p) signal to TP701 using the audio generator.
3. Follow Test Procedure 3. Stereo/SAP Filter Adjustment so that the word "STEREO" can be seen when status button is pressed for TV Channel display.
4. Input no signal to TP701 and check DC level of TP901. Next input 15.734kHz, 49mVrms (139mVp-p) signal to TP701 and check DC level of TP901. Adjust VR953 so that the level becomes equal under both conditions.

Note:

Be sure to do the Stereo/SAP Filter and MTS Block Separation adjustments together with this adjustment. Please note that TP901 is a lead of C964 on the side of Pin 40 of IC902.

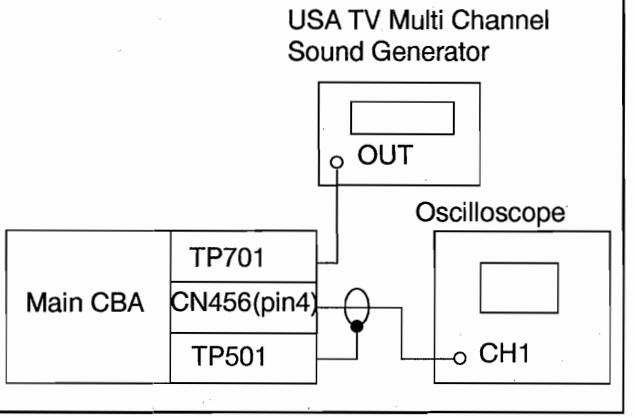
3C. MTS/Separation Adjustment

Choose test procedure FIELD METHOD or FACTORY METHOD. If a TV Modulator/TV Up Converter is provided, follow the FACTORY METHOD because a more accurate adjustment can be done.

FIELD METHOD:

Test Point	Adj. Point	Mode	Input
Pin4 of CN456 (A-OUT R) TP701(MPX) TP501(GND)	VR955 (SEP300Hz) VR954 (SEP3kHz) (Hi-Fi Audio CBA)	E-E	L CH Modulated 300Hz 20% 3KHz 20%
Tape	**Measurement Equipment**	**Spec.**	
Blank Tape	Oscilloscope/ USA TV Multi Channel Sound Generator	Between L and R Level Difference≤ 10dB	

Connections of Measurement Equipment



Reference Notes:

TP501, TP701: Main CBA
Pin4 of CN456, VR955, VR954: Hi-Fi Audio CBA

1. Connect a USA TV Multi Channel Sound Generator to the RF Input and select the correct channel.
2. Connect the Oscilloscope to Pin 4 of CN456.
3. Select 300Hz, Pilot and L on the USA TV Multi Channel Sound Generator. Adjust VR955 to minimize the 300Hz Signal at Pin 4 of CN456.
4. Next select 3kHz, Pilot and L on the USA TV Multi Channel Sound Generator. Adjust VR954 to minimize the 3KHz Signal at Pin 4 of CN456.
5. Repeat steps 3 and 4 several times to achieve the best results.

FACTORY METHOD:

MTS Block Separation Adjustment

Be sure to do the Stereo/SAP filter and VCO Adjustments before this adjustment.

Purpose:

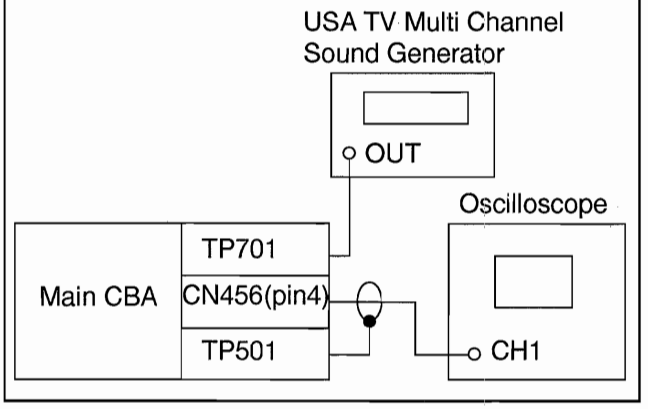
To remove the leakage between L ch and R ch of Stereo output.

Symptom of Misadjustment:

Voice signal of L ch and R ch may be mixed under E-E and/or REC mode.

Test Point	Adj. Point	Mode	Input
Pin4 of CN456 (A-OUT R) TP701(MPX) TP501(GND)	VR955 (SEP 300Hz) (Hi-Fi Audio CBA) VR954 (SEP 3KHz) (Hi-Fi Audio CBA)	E-E	1kHz Mono 100%=100mVrms (283mVp-p)
Tape	**Measurement Equipment**	**Spec.**	
—	Oscilloscope/ USA TV Multi Channel Sound Generator	—	

Connections of Measurement Equipment



Reference Notes:

TP501, TP701: Main CBA
Pin4 of CN456, VR954, VR955: Hi-Fi Audio CBA

1. Input 1kHz Mono 100%= 100mVrms (283mVp-p) to TP701. Next set the sound generator to; Tone: 300Hz, Modulation: 20% (-13.9dB), Pilot: ON, NR: ON, PRE-EN: IN, L only mode.
2. Adjust VR955 so that the output level becomes minimum.
3. Select Tone: 3kHz signal and adjust VR954 so that the output from the R ch becomes minimum.
4. Repeat steps 2 and 3 several times to achieve the best results.

Note:

After completion of Test Procedure 3 (A. B. and C.) reinstall VR701 (Center pin) that was removed in procedure 3A. Stereo/SAP Filter Adjustment, Step 2.

Separation Adjustment

Caution: Do not attempt to do this adjustment without the specified equipment.

Purpose:

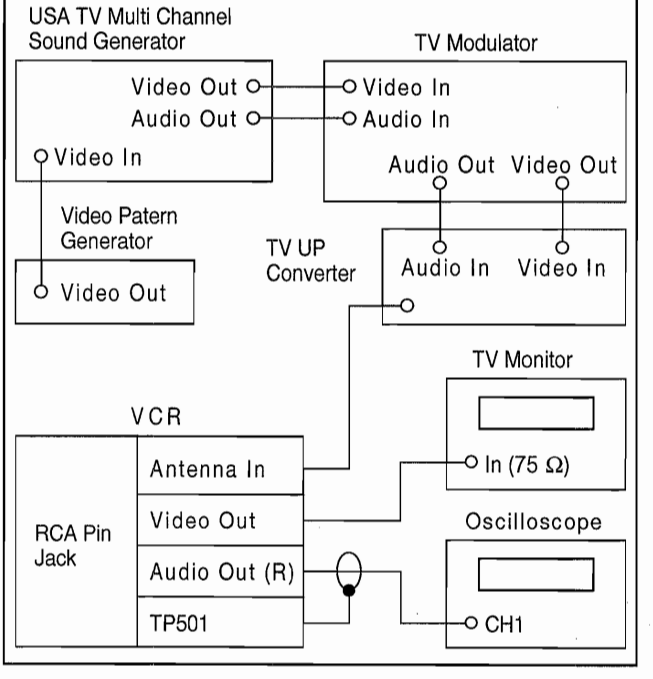
To set the audio output level of the tuner properly.

Symptom of Misadjustment:

Audio signal of L ch and R ch may be mixed under E-E and/or Rec mode.

Test Point	Adj. Point	Mode	Input
Antenna In Video Out Pin4 of CN456 (A-OUT R) TP501(GND)	VR701 (SEP) (MAIN CBA)	E-E	Color Bar with 100% White, 87.5% 3kHz STEREO (L ch Only) 20% (-13.9dB) modulation
Tape	**Measurement Equipment**	**Spec.**	
—	TV Monitor/ Oscilloscope/ USA TV Multi Channel Sound Generator/ TV Modulator/ TV Up Converter/ Video Pattern Generator	—	

Connections of Measurement Equipment



Reference Notes:

Antenna In, Video Out, TP501, VR701: Main CBA
Pin4 of CN456: Hi-Fi Audio CBA

1. Output the color bar with 100% white from the video pattern generator, then make 87.5% modulation by the TV modulator.
2. Output the 1kHz Mono 100% signal from the sound generator, then set 25kHz deviation exactly by the sound generator.
3. Set the sound generator to:

   Tone: 300Hz, Modulation: 20% (-13.9 dB), Pilot: ON, NR: IN, PRE-EN: IN, L only mode.
4. Set the TV up converter to 70dBμ, ch10 (193.25 kHz) then set the channel of the VCR to ch10.
5. Confirm the word "STEREO" appears on the TV monitor. Adjust VR701 to obtain minimum level of R ch.
6. Select tone: 3kHz signal then check if signal leakage of R ch is less than the leakage under Tone: 300Hz signal. If not, adjust VR701.

BLOCK DIAGRAMS

Servo/System Control Block Diagram (LV448HG)

NOTE: The loading motor drive IC is either IC507A(TA7291S) or IC507B(LB1641). These ICS are exchangeable parts.

"● " =SMD

(DECK MECHANISM)

DRUM MOTOR UNIT
DRUM MOTOR M
CN504: D-CONT 1, D-FG 2, AL+12V 3, V-REF 4, D-GND 5, D-PG 6

LOADING MOTOR UNIT
LOADING MOTOR M
CN502: LD-M(+) 1, LD-M(-) 2

ACE HEAD UNIT
CONTROL HEAD
CN287: 5 CTL(+), 6 CTL(-)
CN502: 8 CTL(+), 9 CTL(-)

CAPSTAN MOTOR UNIT
CAPSTAN MOTOR M
CN503: AL+5V 1, C-F/R 2, C-FG 3, V-REF 4, LD-SW 5, C-CONT 6, FG-GND 7, CM-GND 8, AL+12V 9

MODE SW CBA
SW281 MODE SWITCH

D511 LED-P
AL+5V
RS501 REMOTE SENSOR

IC503(1/2)
IC502(1/3)
IC503(2/2)
IC502(2/3)
IC502(3/3)
Q501
TP504 CTL

IC507A
IC507B
CONT.
OUTPUT

Q504 ST-S
Q503 END-S
Q514 T-REEL
PS501 S-REEL
Q511 RESET
TIMER+5V

IC505 MEMORY
SBA 5
SCL 6

MAIN CBA

● IC501 SERVO/SYSTEM CONTROL

11	REMOCON	
24	D-FG	
23	D-PG	
20	REC-CTL	
29	FF/REW-L	
25	PB-CTL	
21	STILL/SLOW-L	
4	D-CONT	
3	C-CONT	
22	C-FG	
44	LM-FWD	
45	LM-REV	
92	ST-S	
91	END-S	
18	T-REEL	
12	S-REEL	
37	RESET	
47	C-F/R	
87	LD-SW	
46	C-DRIVE	
95	I2C BUS DATA	
96	I2C BUS CLOCK	
85	KEY-IN 1	
86	KEY-IN 2	
89	PG-DELAY /TEST	
61–64	G1 – G4	
65, 68, 74, 69, 73	a, d, e, f, j	
13	Hi-Fi-SW	
34	A-MODE	
83	A-CONT	
2	SAP-H	
32	SAP-IN	
31	ST-IN	
7	LP/SLP-H	
6	SLP-H	
5	A-MUTE-H	
30	D-REC-H	
48	D-PB-L	
100	INSEL-1	
99	INSEL-2	
8	D-PB-H	
80	PLL-ENA	
79	PLL/OSD-CLK	
77	PLL/OSD-DATA	
93	C-SYNC	
10	D-V SYNC	
90	V-ENV/REC-SW	
15	ROTA	
9	OSD-BLUE-L	
28	OSD-CS	
1	TRICK-H	
17	H-A-COMP	
16	H-A-SW	
27	SOFT-H	
14	RF-SW	

TP501 GND
CN507: 3 KEY 1 3, 1 KEY 2 1
KEY SWITCH ×2
FUNCTION CBA
CN651: KEY SWITCH ×2
VR501 SW-POINT
TP502 S-INH
FIP502 FIP
SW506 REC SW
TU701: WF12 PLL-ENA 10, WF10 PLL-CLK 8, WF11 PLL-DATA 9
TP302 RF-SW WF2

TO Hi-Fi AUDIO BLOCK: A-MUTE-H, D-PB-H, Hi-Fi-SW, A-MODE, A-CONT, SAP-H, SAP-L, ST-L, INSEL-1, INSEL-2
TO AUDIO BLOCK: SP/LP/SLP, A-MUTE-H, D-REC-H, D-PB-L
TO VIDEO BLOCK: D-PB-L, INSEL-1, INSEL-2, D-PB-H, D-REC-H, SP/LP/SLP, OSD-CLK, OSD-DATA, C-SYNC, D-V SYNC, V-ENV, ROTA, OSD-BLUE-L, OSD-CS, TRICK-H, H-A-COMP, H-A-SW, SOFT-H, RF-SW

Servo/System Control Block Diagram (SE447SG,LV446G)

"●" =SMD

NOTE: The loading motor drive IC is either IC507A(TA7291S) or IC507B(LB1641). These ICS are exchangeable parts.

(DECK MECHANISM)

DRUM MOTOR UNIT
DRUM MOTOR M
CN504: D-CONT 1, D-FG 2, AL+12V 3, V-REF 4, D-GND 5, D-PG 6

LOADING MOTOR UNIT
LOADING MOTOR M
CN502: LD-M(+) 1, LD-M(-) 2

ACE HEAD UNIT
CONTROL HEAD
CN287: 5 CTL(+), 6 CTL(-)
CN502: 8 CTL(+), 9 CTL(-)

CAPSTAN MOTOR UNIT
CAPSTAN MOTOR M
CN503: AL+5V 1, C-F/R 2, C-FG 3, V-REF 4, LD-SW 5, C-CONT 6, FG-GND 7, CM-GND 8, AL+12V 9

MODE SW CBA
SW281 MODE SWITCH

D511 LED-P ← AL+5V

IC503(1/2): V-REF → pin 13, pin 12; pin 14 → V-REF
IC502(1/3): V-REF → pin 4, pin 5; pin 2 → 24 D-FG; pin 10, pin 11; pin 13 → 23 D-PG

Q501
IC503(2/2): V-REF → pin 9, pin 10; pin 8 → TP504 CTL
IC502(2/3): V-REF → pin 8, pin 9; pin 14 → 25 PB-CTL
IC502(3/3): pin 6, pin 7; pin 1 → 22 C-FG

IC507A / IC507B: CONT. / OUTPUT
IC507A: 1, 9, 7, 3
IC507B: 6, 5, 2, 10

Q504 ST-S
Q503 END-S
Q514 T-REEL
PS501 S-REEL

Q511 RESET: TIMER+5V → RESET → 37 RESET

AL+5V → 87 LD-SW
47 C-F/R
46 C-DRIVE

(SE447SG) IC505 MEMORY
SBA 5 ↔ 95 I2C BUS DATA
SCL 6 ↔ 96 I2C BUS CLOCK

MAIN CBA

• IC501 SERVO/SYSTEM CONTROL

RS501 REMOTE SENSOR → 11 REMOCON

TP501 GND

KEY-IN 1 85 ← KEY SWITCH
KEY-IN 2 86 ← KEY SWITCH

CN507: 3 KEY 1, 1 KEY 2

FUNCTION CBA
CN651: 3 KEY 1 ← KEY SWITCH; 1 KEY 2 ← KEY SWITCH

TP502 S-INH
AL+5V → VR501 SW-POINT → PG-DELAY /TEST 89

D519 P-ON ← P-ON+10V

D520 REC
REC LED 58, 59

D521 TIMER
TIMER LED 57, 60, 61

D522 CASS
CASSETTE IN LED 58, 59

VCR LED 71, 72, 74
D523 VCR

20 REC-CTL
29 FF/REW-L
21 STILL/SLOW-L
4 D-CONT
3 C-CONT
44 LM-FWD
45 LM-REV
92 ST-S
91 END-S
18 T-REEL
12 S-REEL

TU701
WF12 10 PLL-ENA
WF10 8 PLL-CLK
WF11 9 PLL-DATA

Hi-Fi-SW 13
A-MODE 34
A-CONT 83
SAP-H 2
SAP-IN 32
ST-IN 31

TO Hi-Fi AUDIO BLOCK: A-MUTE-H, D-PB-H, Hi-Fi-SW, A-MODE, A-CONT, SAP-H, SAP-L, ST-L, INSEL-1, INSEL-2

LP/SLP-H 7
SLP-H 6
A-MUTE-H 5
D-REC-H 30
D-PB-L 48

TO AUDIO BLOCK: SP/LP/SLP, A-MUTE-H, D-REC-H, D-PB-L

SW506 REC SW

INSEL-1 100
INSEL-2 99
D-PB-H 8

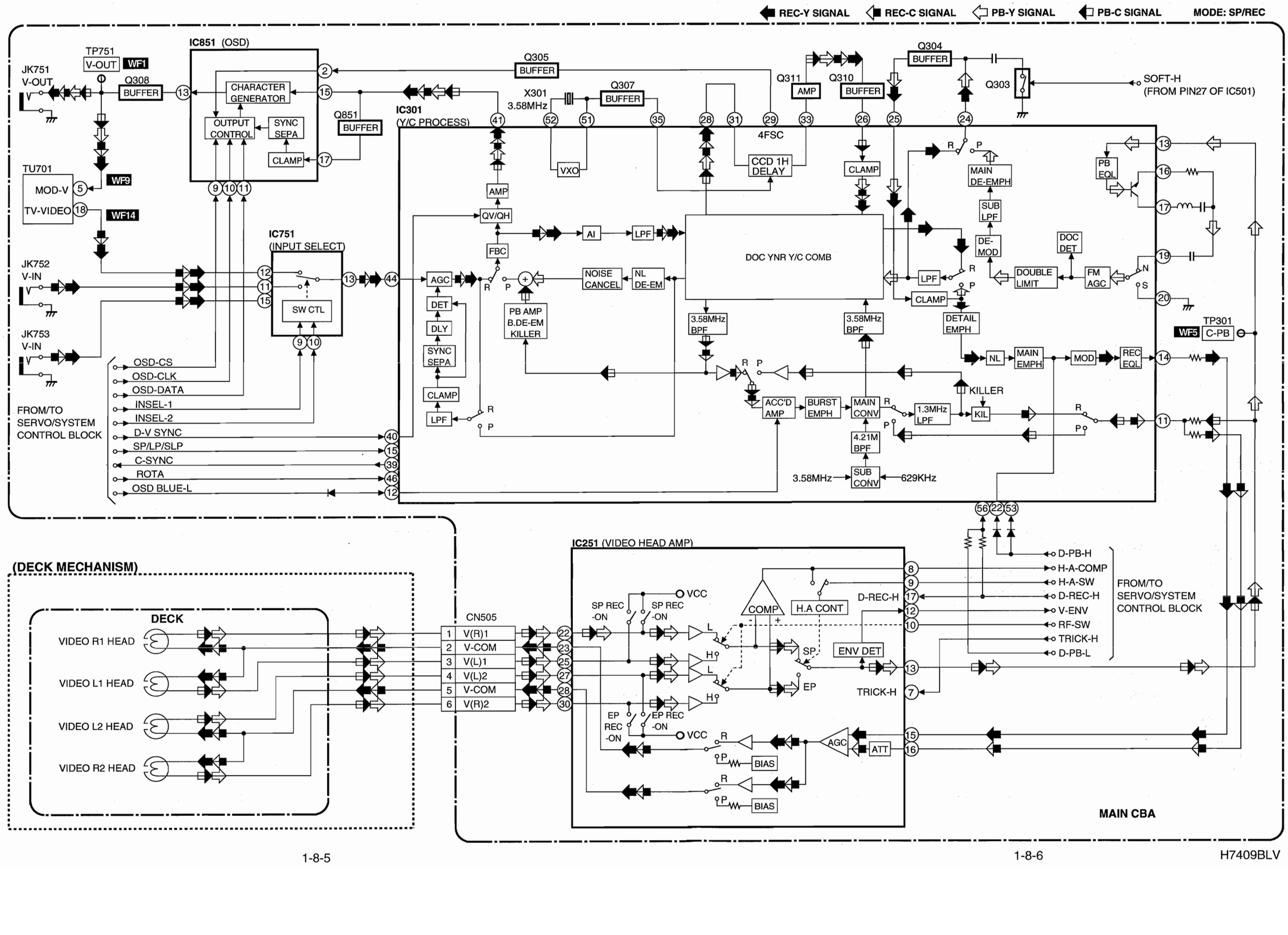
D-PB-L, INSEL-1, INSEL-2, D-PB-H, D-REC-H, SP/LP/SLP

PLL-ENA 80
PLL/OSD-CLK 79
PLL/OSD-DATA 77
C-SYNC 93
D-V SYNC 10
V-ENV/REC-SW 90
ROTA 15
OSD-BLUE-L 9
OSD-CS 28
TRICK-H 1
H-A-COMP 17
H-A-SW 16
SOFT-H 27
RF-SW 14

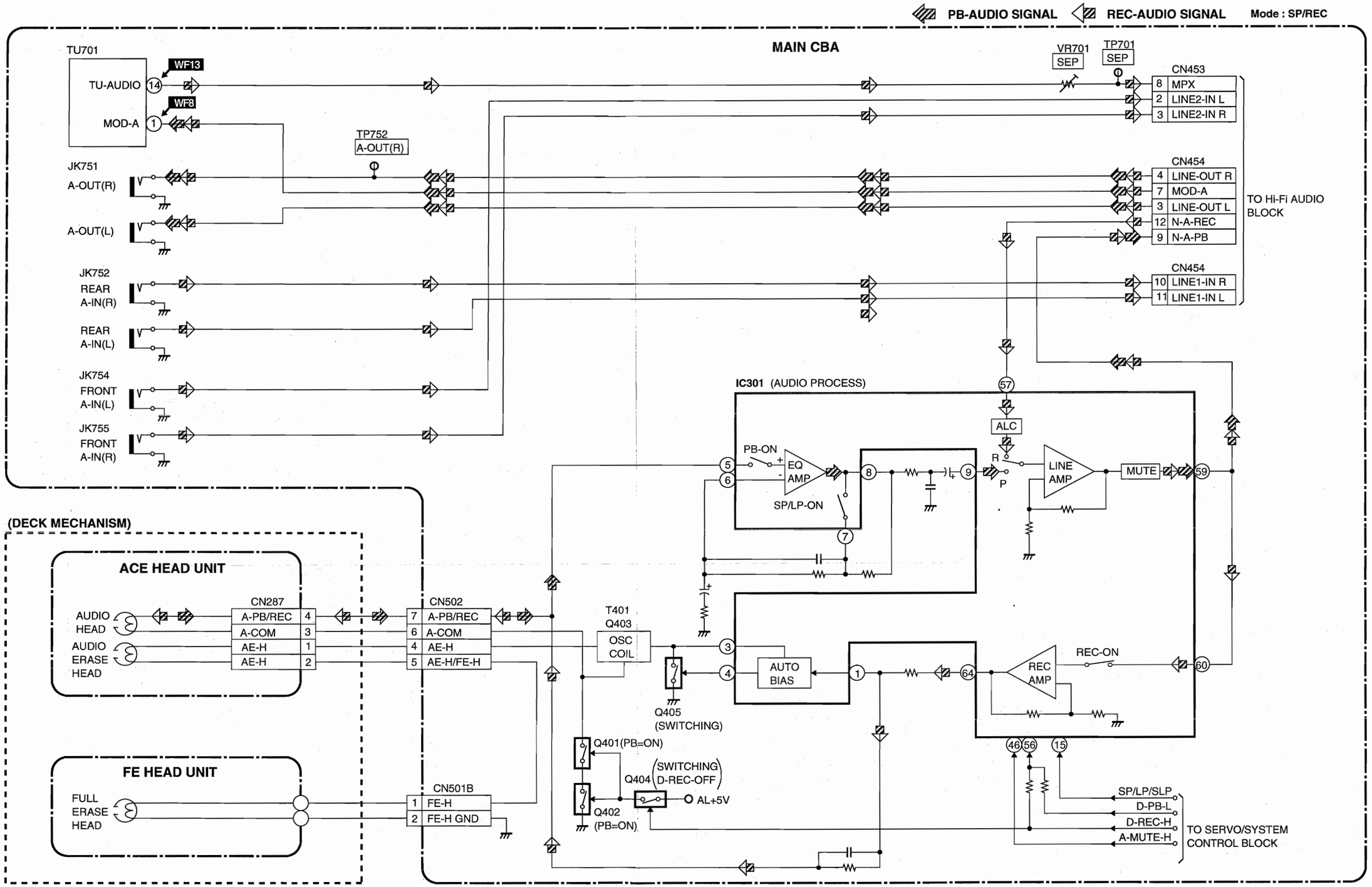
TO VIDEO BLOCK: OSD-CLK, OSD-DATA, C-SYNC, D-V SYNC, V-ENV, ROTA, OSD-BLUE-L, OSD-CS, TRICK-H, H-A-COMP, H-A-SW, SOFT-H, RF-SW

TP302 RF-SW WF2

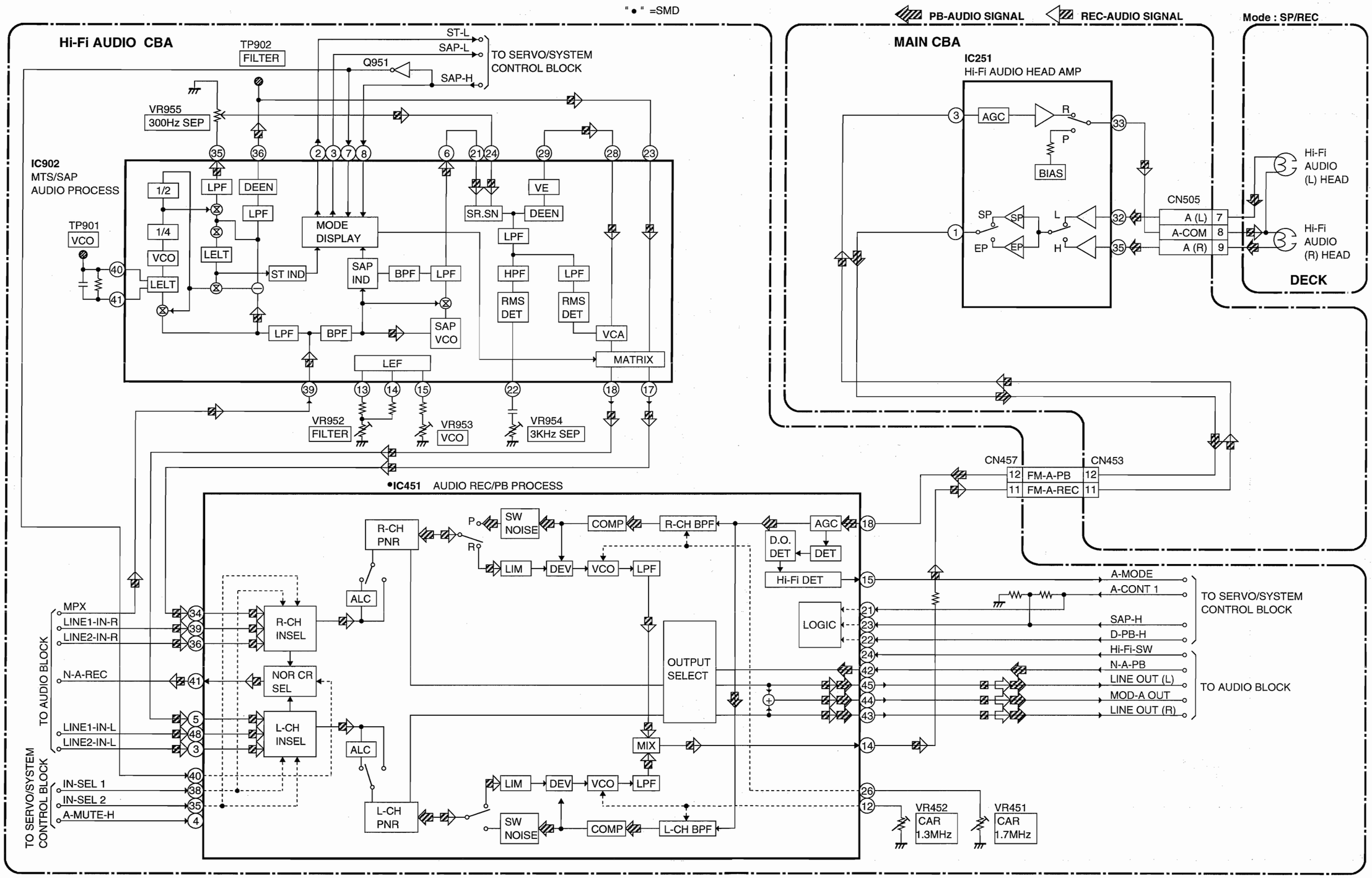
Video Block Diagram



Audio Block Diagram



Hi-Fi Audio Block Diagram

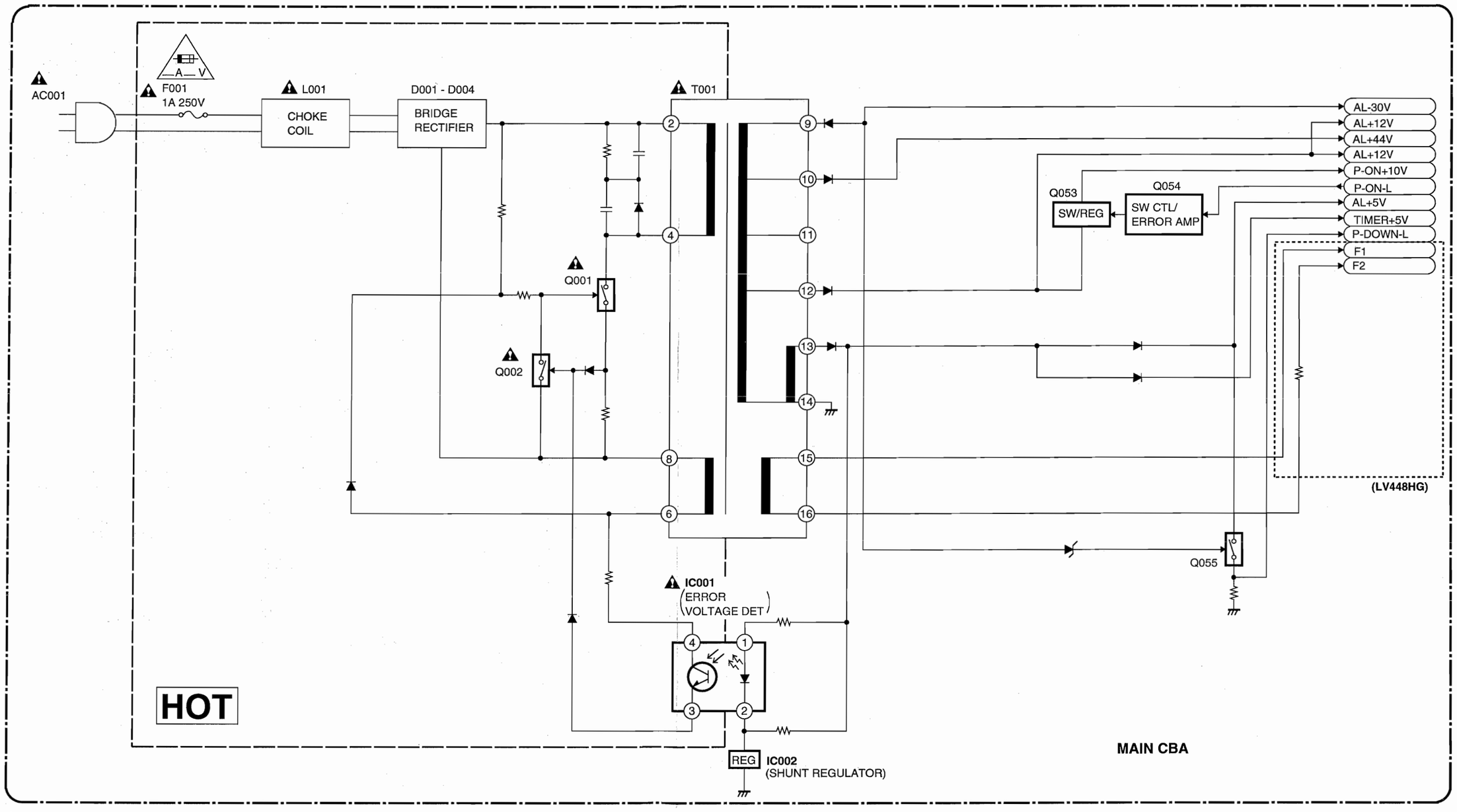


Power Supply Block Diagram

NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

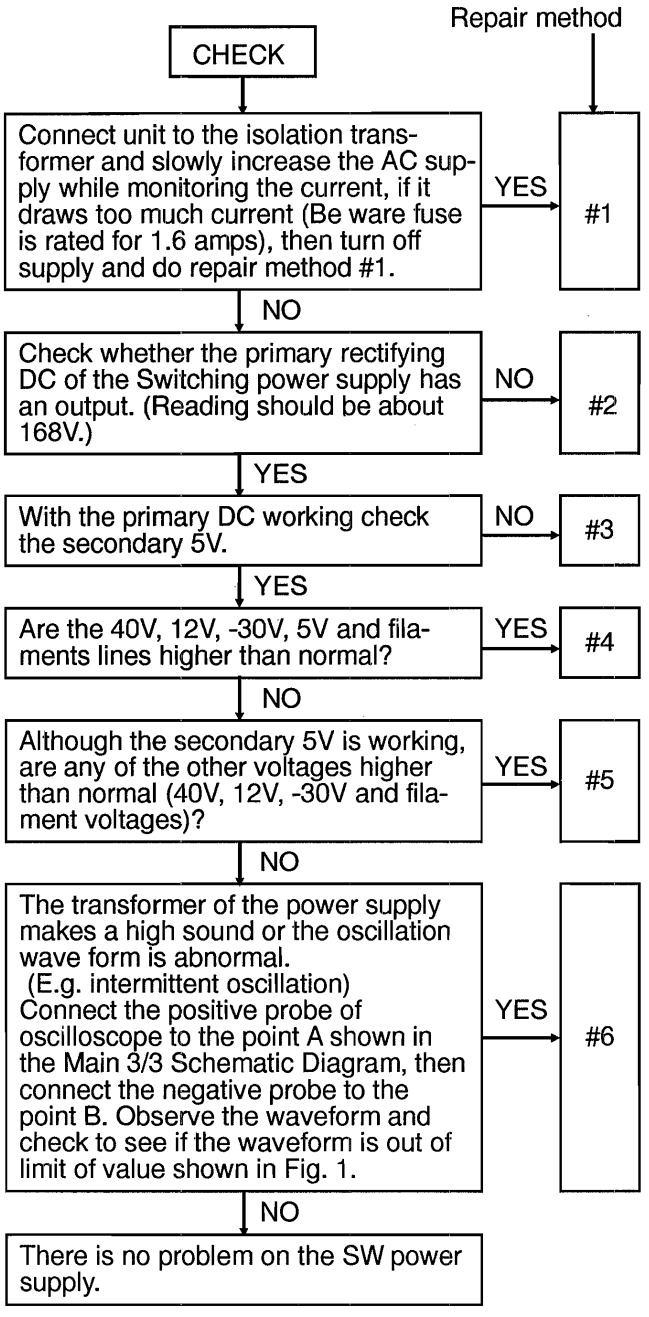
CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.
"This symbol means fast operating fuse."
"Ce symbole représente un fusible à fusion rapide."

CAUTION !
Fixed voltage power supply circuit is used in this unit.
If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.



Power Supply Trouble Shooting Guide

It is highly recommended that a variable isolation transformer which can monitor current be used. (Alternatively a variable AC source which monitors current will do). Read directions below before power is added!


Repair method
CHECK
Connect unit to the isolation transformer and slowly increase the AC supply while monitoring the current, if it draws too much current (Be ware fuse is rated for 1.6 amps), then turn off supply and do repair method #1.
YES
#1
NO
Check whether the primary rectifying DC of the Switching power supply has an output. (Reading should be about 168V.)
NO
#2
YES
With the primary DC working check the secondary 5V.
NO
#3
YES
Are the 40V, 12V, -30V, 5V and filaments lines higher than normal?
YES
#4
NO
Although the secondary 5V is working, are any of the other voltages higher than normal (40V, 12V, -30V and filament voltages)?
YES
#5
NO
The transformer of the power supply makes a high sound or the oscillation wave form is abnormal.
(E.g. intermittent oscillation)
Connect the positive probe of oscilloscope to the point A shown in the Main 3/3 Schematic Diagram, then connect the negative probe to the point B. Observe the waveform and check to see if the waveform is out of limit of value shown in Fig. 1.
YES
#6
NO
There is no problem on the SW power supply.

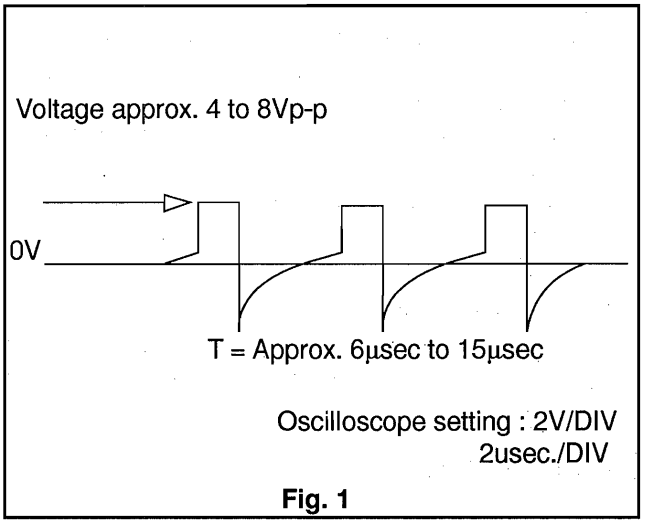


Fig. 1

Repair method #1

(Power must be off)

Short circuit in the secondary side. check diode D012, D013, and {(FIP display model only: D015, D016 and D017) or (LED display model only: D015, D016)}, switching transistor (Q001), control transistor (Q002), diode (D006), and resistor (R014) replace as necessary.

Disconnect 40V diode (D013), 12V diode (D015), -30V diode (D012), 5V diode (D016) and {FIP display model only: filament voltage diode (D017)} Check the load continuity of 40V line, 12V line, -30V line, 5V line and filament voltage line through a tester (resistance range).

If the tester indicates a lower resistance value around 0 ohm, the line is short-circuited.

Before repairing the switching power supply, find out the short-circuited area of such line and repair it.

If the tester does not indicate any low resistance value (around 0 ohm), no load is short-circuited and there is no problem.

2] Check for any defective parts while the secondary rectifying diodes are disconnected (D012, D013, D015 and D016, FIP display model only: D017) perform a diode check in both forward and reverse directions through a tester.

3] Remove the following components and check for defects: snubber diode (D005), switching transistor (Q001), emitter resistor (R014), control transistor (Q002).

Repair method #2

Check the fuse 1.0A (F001), primary rectifying diodes (D001-D004) as possible problems. Remove the above mentioned parts and check them. The circuit which turns on switching transistor (Q001) may be regarded as a possible cause, even if the load at the secondary side is shorted, it can't be detected because switching transistor (Q001) isn't operating. Perform check according to the step 1 and 2 of repair method #1 and check the following parts:

(Remove the part from PCB)

Switching transistor (Q001), emitter resistor (R014), VB diode (D008). base resistor 82 ohm (R008) and start resistor (R003-R005).

Repair method #3

A circuit to turn on switching transistor (Q001) may not work and this may be regarded as a cause of trouble. Even if the load at the secondary side is short-circuited, it cannot be detected because switching transistor (Q001) does not turn on. Therefore, perform check according to the steps 1] and 2] of the repair method #1 and execute the under-mentioned parts breakage check.

(Remove the part from PCB.)

switching transistor (Q001), emitter resistor (R014), control transistor (Q002), VB diode (D008), base resistor 82 ohm (R008) and start resistor (R003 - R005).

Repair method #4

The feedback circuit which is monitored by the output of D016 5V may not work and this may be regarded as a possible cause, remove control transistor (Q002), diode (D007) and check for defects. More over, a photo coupler (IC001) and regulator (IC002) may be defective, replace any defective parts with factory originals.

Repair method #5

If the output voltage of the secondary side is slightly high, the line load may be in the "OPEN" state and this may be regarded as a cause of trouble. If there is no output voltage on the secondary side, the rectifying diodes (D012, D013, D015 and (FIP display model only only: D017) may be defective.

Repair method #6

Check R012, R016, C008 and R015, for possible problems.

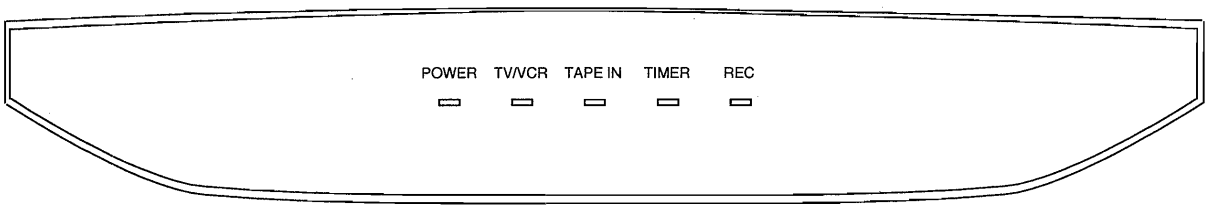
Function Indicator Symbols

Note:

The Following Symbols Will appear on the Indicator Panel to Indicate the Current Mode or Operation of the VCR. On-Screen modes will also be Momentarily displayed on the TV screen when you press the operation buttons.

Display panel

Model No, : SE447SG, LV446G



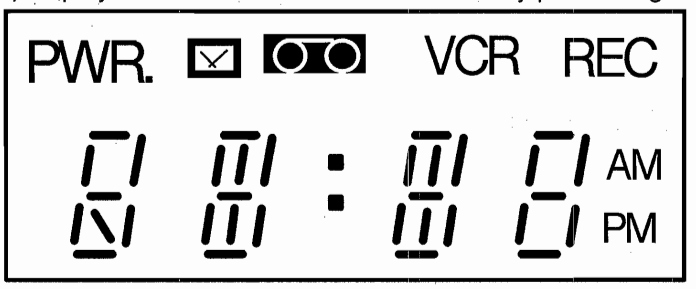
" H "= LED Light on, " L "= LED Light off

LED MODE	INDICATOR ACTIVE	
POWER	Power on = " H " Power off = " L "	
TV/VCR	VCR mode = " H " TV mode = " L "	
TAPE IN	Cassette in = " H " Cassette out = " L "	
1. When Reel and Capstan Mechanism is Not Functioning Correctly	Cassette in	Blinks at 0.8Hz interval
2. When Tape Loading Mechanism is Not Functioning Correctly	Cassette in	Blinks at 1.6Hz interval
3. When Cassette Loading Mechanism is Not Functioning Correctly	Cassette in	Blinks at 3.2Hz interval
4. When the Drum is Not working properly	Cassette in	Blinks at 6.4Hz interval
TIMER	Timer stand by = " H " One touch recording = " H " Timer recording = " H " General mode = " L "	
REC	REC mode = " H " REC pause =" H " General mode = " L "	Blinks at 0.8Hz interval

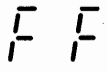
Model: LV448HG

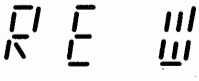
Display panel

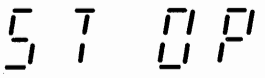
Note: Briefly (5 seconds) displays which feature the VCR is currently performing.



Playback


Fast forward


Rewind


Stop

Recording

LED MODE	INDICATOR ACTIVE	
CASSET "IN" CASSET "OUT"	 	ON OFF
VCR/TV VCR MODE VCR/TV TV MODE	" VCR " " VCR "	ON OFF
CLOCK	" 88:88 " " AM " " PM "	ON ON
POWER ON	" PWR "	ON
REC	" REC "	ON
REC PAUSE	" REC "	Blinks at 0.8Hz interval
T-REC, OTR		ON (T-REC OFF, T-REC incomplete Blinks at 0.8Hz interval)
AUTE RETURN		Blinks at 0.8Hz interval)
When Reel and Capstan Mechanism is Not Functioning Correctly	" No. 1(grid 1)	Blinks at 0.8Hz interval
When Tape Loading Mechanism is Not Functioning Correctly	" No. 2(grid 1)	Blinks at 0.8Hz interval
When Cassette Loading Mechanism is Not Functioning Correctly	" No. 3(grid 1)	Blinks at 0.8Hz interval
When the Drum is Not working properly	" No. 4(grid 1)	Blinks at 0.8Hz interval
S-INH CONDITION	ALL MODE	Blinks at 0.8Hz interval

SCHEMATIC DIAGRAMS / CBA'S AND TEST POINTS

Standard Notes

Warning

Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the mark " ⚠ " in the schematic diagram and the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts that do not have the same safety characteristics as specified in the parts list may create shock, fire, or other hazards.

Capacitor Temperature Markings

Mark	Capacity change rate	Standard temperature	Temperature range
(B)	±10%	20°C	-25~+85°C
(F)	+30 -80%	20°C	-25~+85°C
(SR)	±15%	20°C	-25~+85°C
(Z)	+30 -80%	20°C	-10~+70°C

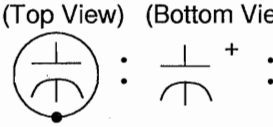
Capacitors and transistors are represented by the following symbols.

Note:

1. Do not use the part number shown on these drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since these drawings were prepared.
2. All resistance values are indicated in ohms ($K=10^3$, $M=10^6$).
3. Resistor wattages are 1/4W or 1/6W unless otherwise specified.
4. All capacitance values are indicated in μF ($P=10^{-6}\mu F$).
5. All voltages are DC voltages unless otherwise specified.

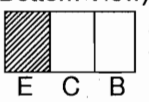
CBA Symbols

(Top View) (Bottom View)



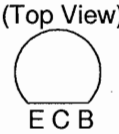
: Electrolytic Capacitor

(Bottom View)



: Transistor or Digital Transistor

(Top View)



NPN Transistor

(Top View)

PNP Transistor

(Top View)

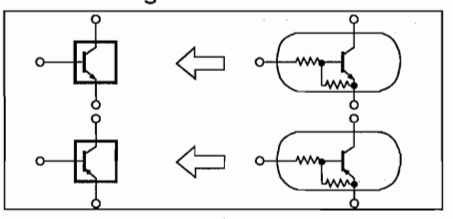
NPN Digital Transistor

(Top View)

PNP Digital Transistor

Schematic Diagram Symbols

Digital Transistor



LIST OF CAUTION, NOTES, AND SYMBOLS USED IN THE SCHEMATIC DIAGRAMS ON THE FOLLOWING PAGES:

1. **CAUTION:**

FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.

2. **CAUTION:**

This symbol means fast operating fuse.
Ce symbole représente un fusible à fusion rapide.

Fixed Voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F001) is blown, first check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

3. **Note:**

(1) Do not use the part number shown on the drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since the drawings were prepared.

(2) To maintain original function and reliability of repaired units, use only original replacement parts which are listed with their part numbers in the parts list section of the service manual.

4. Wire Connectors

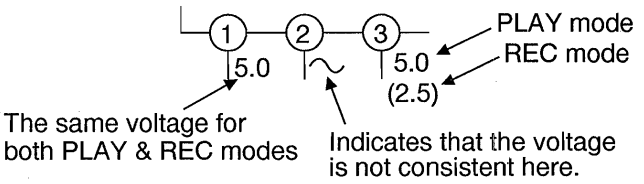
(1) Prefix symbol "CN" means "connector." (Can disconnect and reconnect)

(2) Prefix symbol "CL" means "wire-solder holes of the PCB." (Wire is soldered directly.)

5. Note: Mark "•" is a leadless (chip) component.

6. Mode: SP/REC

7. Voltage indications for PLAY and REC modes on the schematics are as shown below:



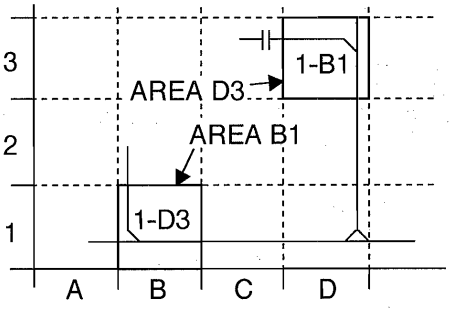
Unit: Volts

8. How to read converged lines

1-D3
- Distinction Area
- Line Number (1 to 3 digits)

Examples:

1. "1-D3" means that line number "1" goes to area "D3".
2. "1-B1" means that line number "1" goes to area "B1".



9. Test Point Information

: Indicates a test point with a jumper wire across a hole in the PCB.

: Used to indicate a test point with a component lead on foil side.

: Used to indicate a test point with no test pin.

 : Used to indicate a test point with a test pin.

Main 1/3 Schematic Diagram

∗1 **Note: The remote receiver is either type C or type D. These two types are exchangeable and can be equally used whichever the model is. The difference between type C and type D is shown in the table below.**

	RS501	J61	J62	J63	J64
Type C	PIC-21042LU	Not Used	WIRE	Not Used	WIRE
Type D	NJL61V367S NJL51V367	WIRE	Not Used	WIRE	Not Used

∗2 **Note: The loading motor drive IC is either type A or type B. These two types are exchangeable and can be equally used whichever the model is. The difference between type A and type B is shown in the table below.**

	IC507A	IC507B	C555
Type A	TA7291S	Not Used	Not Used
Type B	Not Used	LB1641	0.01uF

Audio (REC) Audio (PLAY)

MAIN CBA

FUNCTION CBA

SYSCON/TIMER/SERVO BLOCK

MAIN 1/3	
Ref No.	Position
ICS	
IC501	C-2
IC502	B-4
IC503	C-4
IC505	D-1
IC507A	E-3
IC507B	E-3
TRANSISTORS	
Q501	C-4
Q503	B-1
Q504	C-1
Q511	E-1
Q514	C-1
TEST POINTS	
TP501	E-5
TP503	D-5
TP504	B-4
CONNECTORS	
CN501B	A-5
CN502	A-4
CN503	A-4
CN504	A-3
CN507	E-5
CN651	E-5
VARIABLE RESISTORS	
VR501	B-2

Main 2/3 Schematic Diagram

*3 Note: The tuner unit is either type E or type F.These two types are exchangeable and can be equally used whichever the model is. The difference between type E and type F is shown in the table below.

	TU701	C711A	C711B	R708
Type E	UTUNNTUJR001	Not Used	470uF	75
Type F	UTUNNTUSP007 /UTUNNTUJR002 /UTUNNTUAL015	10uF	Not Used	Not Used

Luminance + Chrominance(REC)
Luminance(REC)
Chrominance(REC)
Audio (REC)

Luminance + Chrominance(PLAY)
Luminance(PLAY)
Chrominance(PLAY)
Audio (PLAY)

MAIN CBA
HEAD AMP BLOCK

TUNER BLOCK

OSD BLOCK

VIDEO/AUDIO BLOCK

INSEL BLOCK

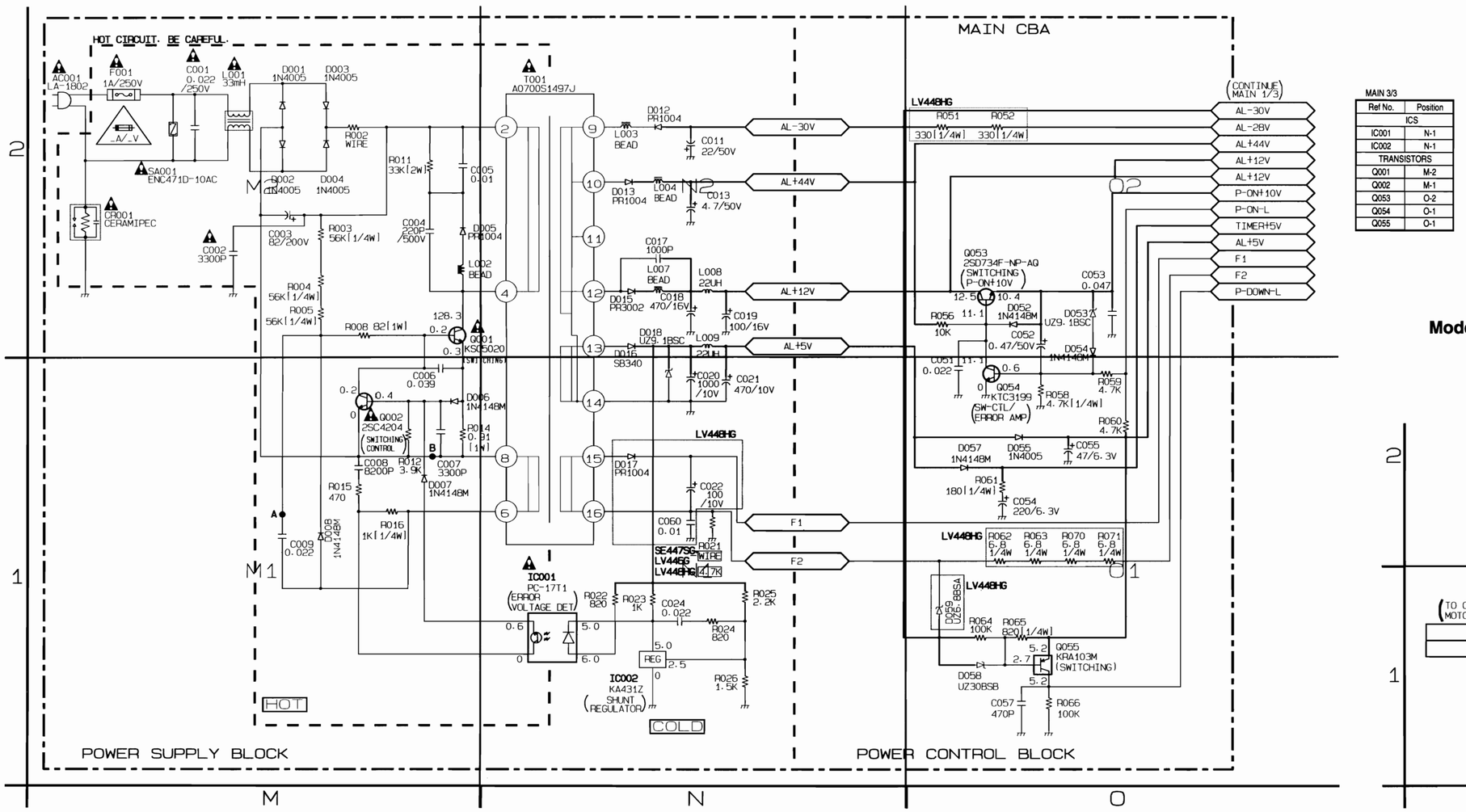
MAIN 2/3	
Ref No.	Position
ICS	
IC251	H-4
IC301	J-2
IC751	L-1
IC851	L-3
TRANSISTORS	
Q303	J-2
Q304	K-2
Q305	J-3
Q307	H-3
Q308	L-2
Q310	J-3
Q311	J-3
Q401	H-2
Q402	H-1
Q403	H-2
Q404	H-1
Q405	I-1
Q851	L-3
TEST POINTS	
TP301	J-1
TP302	H-4
TP701	K-5
TP751	L-2
TP752	L-2
CONNECTORS	
CN505	G-5
VR701	L-4

Main 3/3 Schematic Diagram

NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.
This symbol means fast operating fuse.
Ce symbole représente un fusible à fusion rapide.

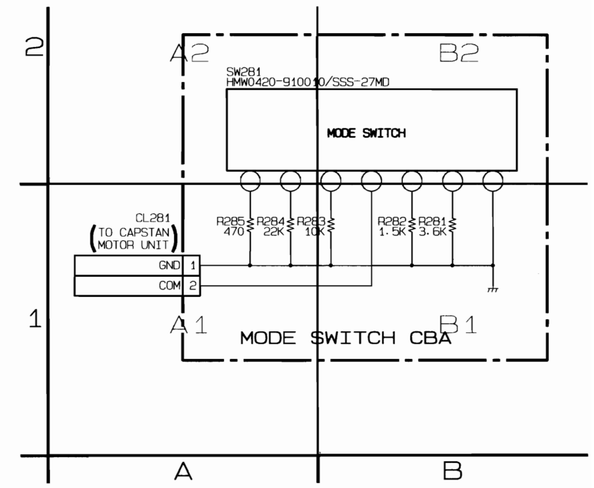
CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components in the power supply circuit to fail.



MAIN 3/3

Ref No.	Position
ICS	
IC001	N-1
IC002	N-1
TRANSISTORS	
Q001	M-2
Q002	M-1
Q053	O-2
Q054	O-1
Q055	O-1

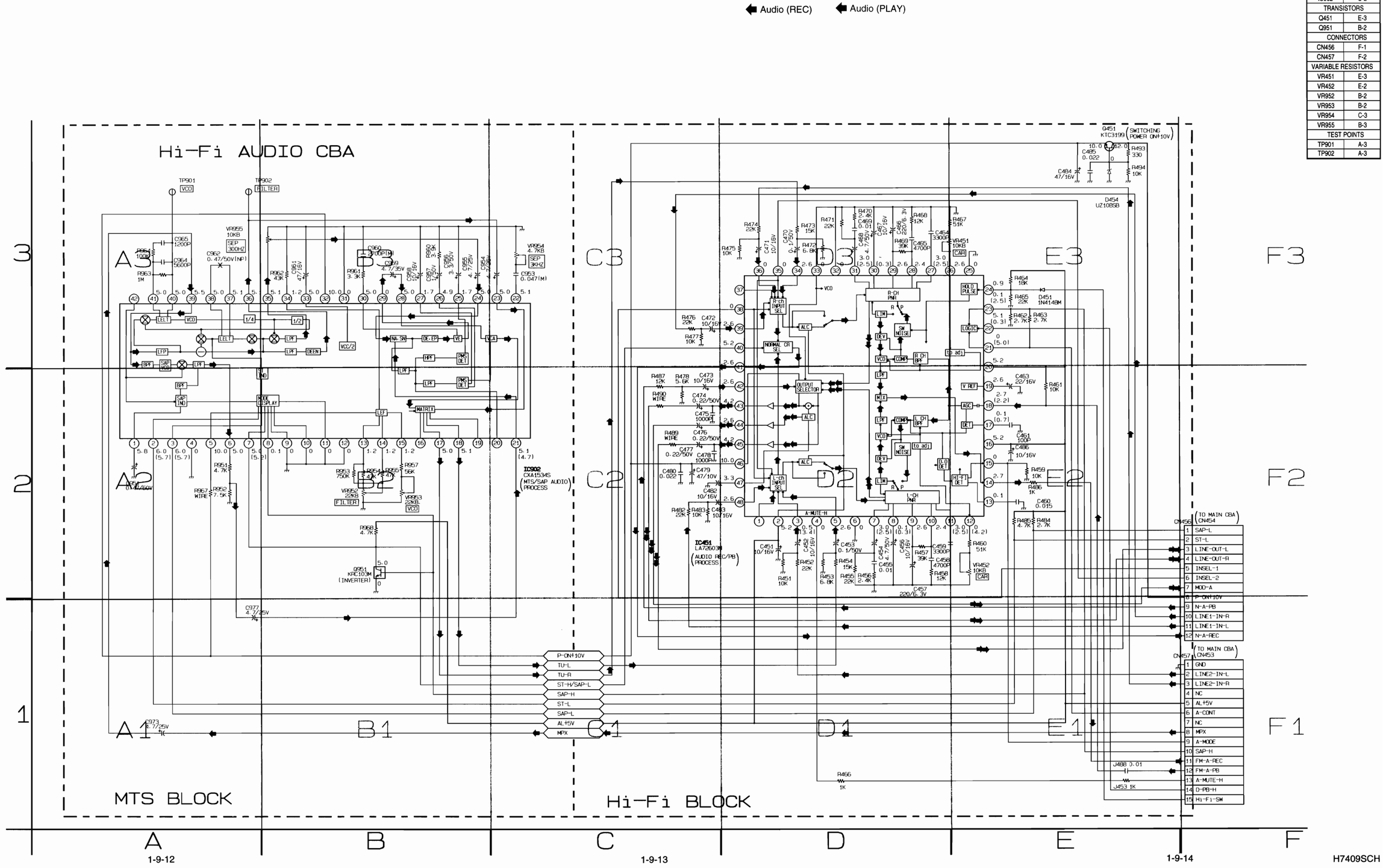
Mode Switch Schematic Diagram



Hi-Fi Audio Schematic Diagram

Hi-Fi AUDIO

Ref No.	Position
ICS	
IC451	D-2
IC902	C-2
TRANSISTORS	
Q451	E-3
Q951	B-2
CONNECTORS	
CN456	F-1
CN457	F-2
VARIABLE RESISTORS	
VR451	E-3
VR452	E-2
VR952	B-2
VR953	B-2
VR954	C-3
VR955	B-3
TEST POINTS	
TP901	A-3
TP902	A-3

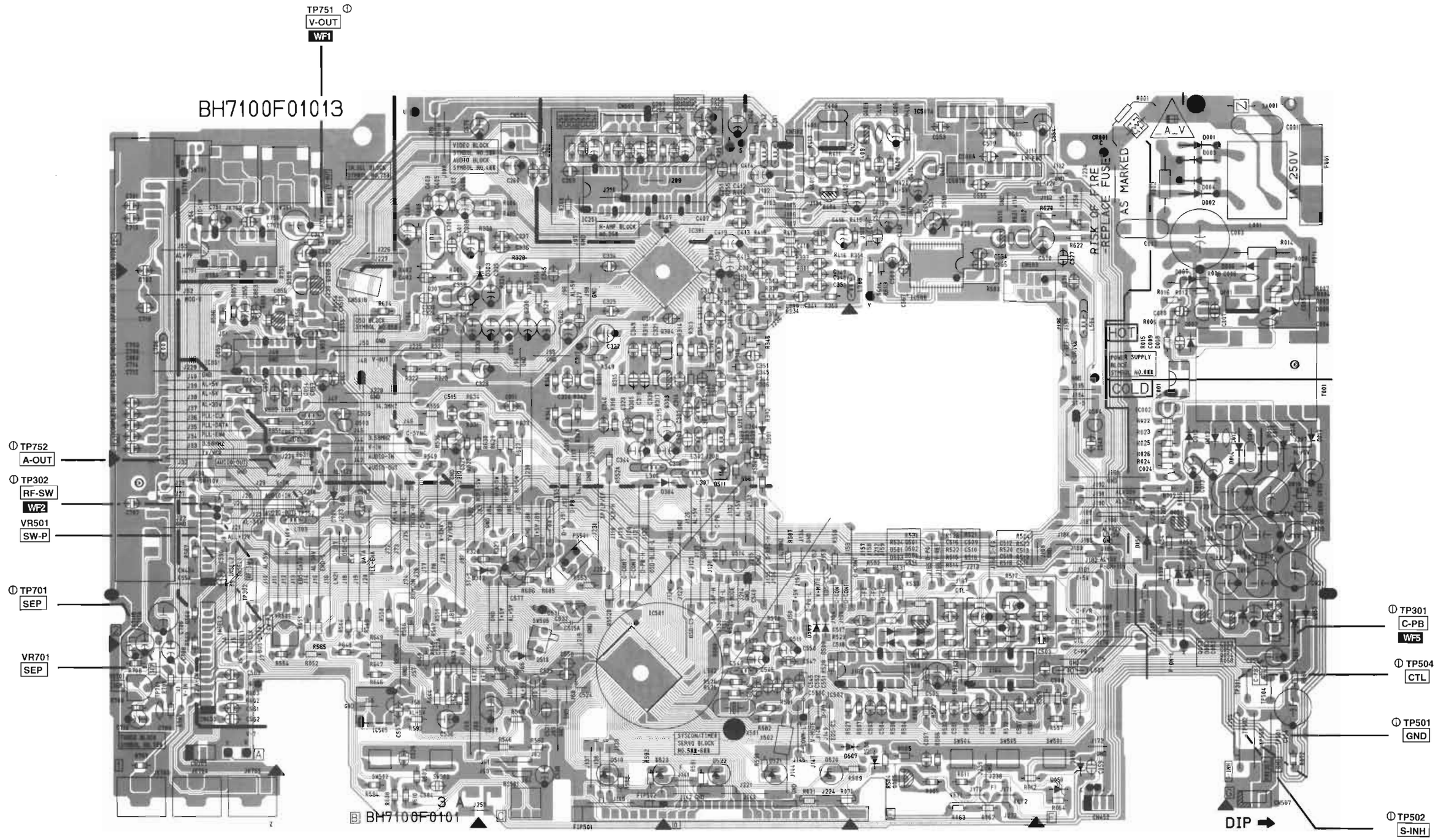


Main CBA Top View

NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE
RISK OF FIRE-REPLACE FUSE AS MARKED.
"This symbol means fast operating fuse."
"Ce symbole représente un fusible à fusion rapide."

CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components in the power supply circuit to fail.

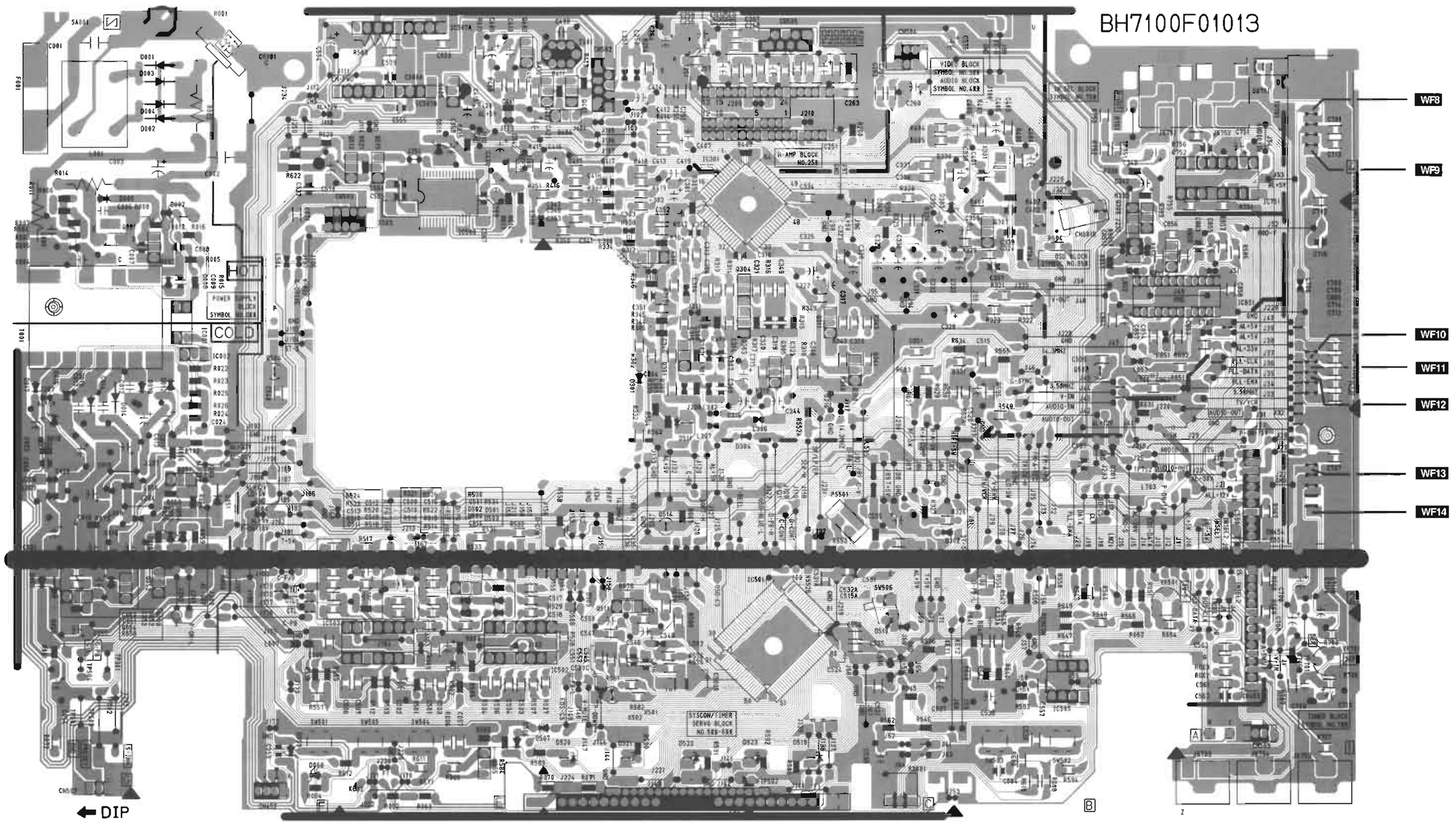


Main CBA Bottom View

NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.
"This symbol means fast operating fuse."
"Ce symbole représente un fusible à fusion rapide."

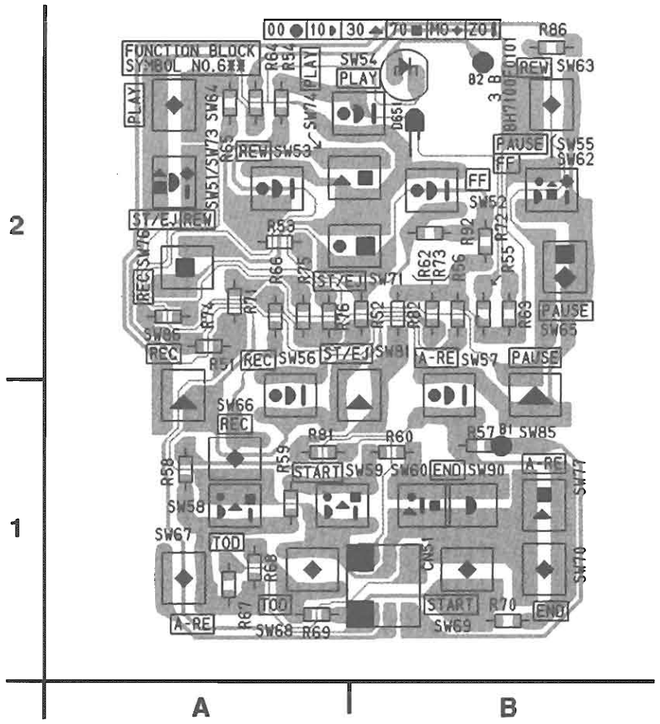
CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.



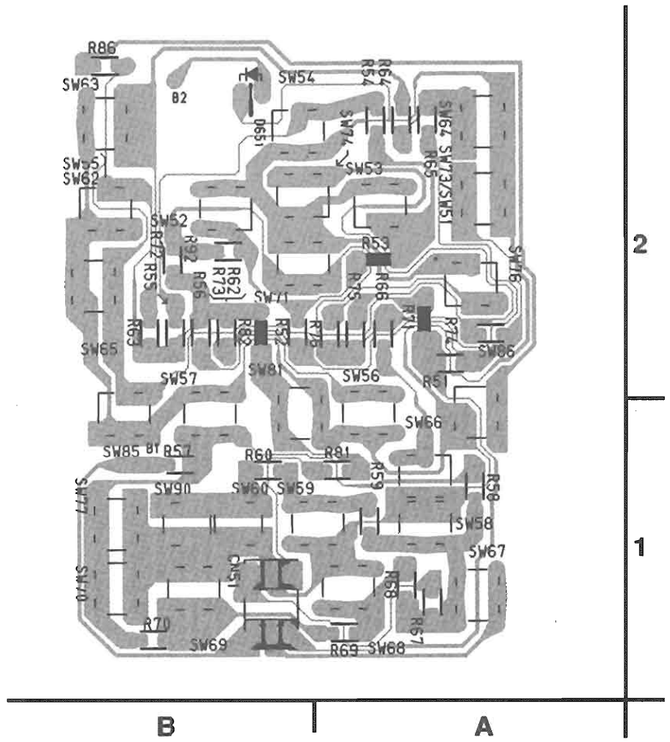
MAIN CBA

Ref No.	Position	Ref No.	Position	Ref No.	Position	Ref No	Position	Ref No.	Position
ICS		TRANSISTORS		TRANSISTORS		TEST POINTS		CONNECTORS	
IC001	F-3	Q001	F-3	Q401	D-4	TP302	A-2	CN505	C-4
IC002	F-3	Q002	F-3	Q402	D-4	TP501	F-1	CN507	F-1
IC251	C-4	Q053	F-2	Q403	E-4	TP503	F-1	VARIABLE RESISTORS	
IC301	D-4	Q054	F-2	Q404	D-4	TP504	F-1	VR501	B-2
IC501	C-1	Q055	E-1	Q405	E-4	TP701	A-1	VR701	A-1
IC502	D-1	Q303	D-3	Q503	B-3	TP751	B-4		
IC503	E-1	Q304	D-3	Q504	F-3	TP752	A-2		
IC505	B-1	Q305	C-3	Q511	D-2	CONNECTORS			
IC507A	E-4	Q307	B-3	Q514	D-2	CN501B	B-3		
IC507B	E-4	Q308	B-3	Q851	B-3	CN502	D-4		
IC751	A-4	Q310	C-3	TEST POINTS		CN503	E-3		
IC851	A-3	Q311	C-3	TP301	F-1	CN504	C-4		

Function CBA Top View

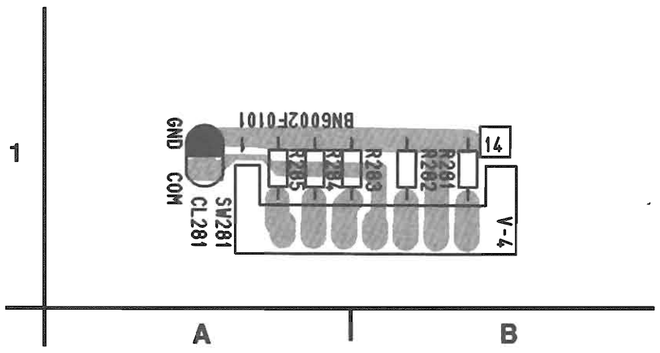


Function CBA Bottom View

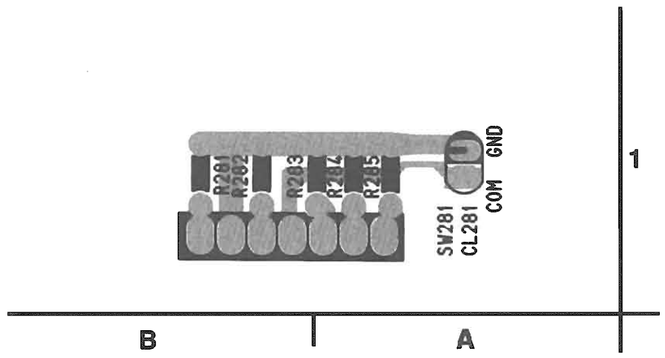


BH7100F01013B

Mode Switch CBA Top View

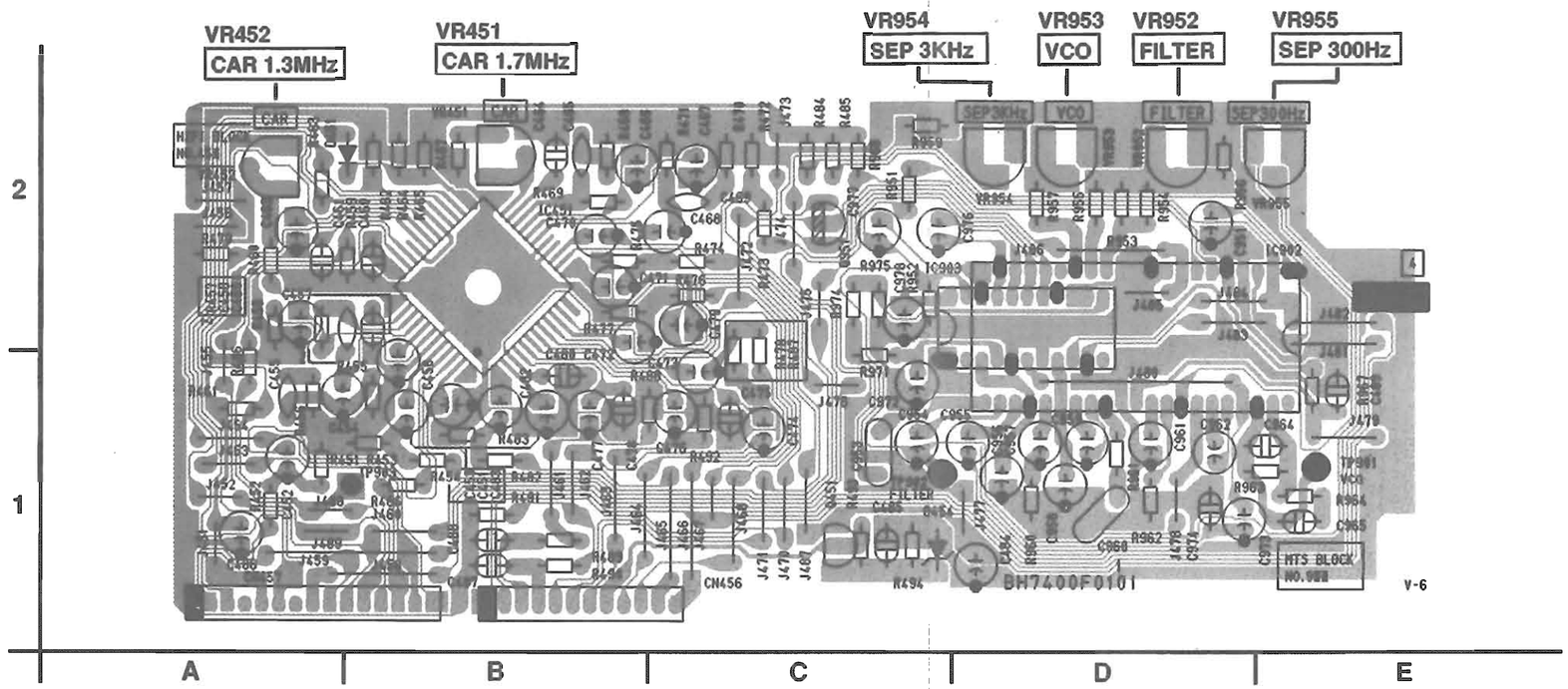


Mode Switch CBA Bottom View

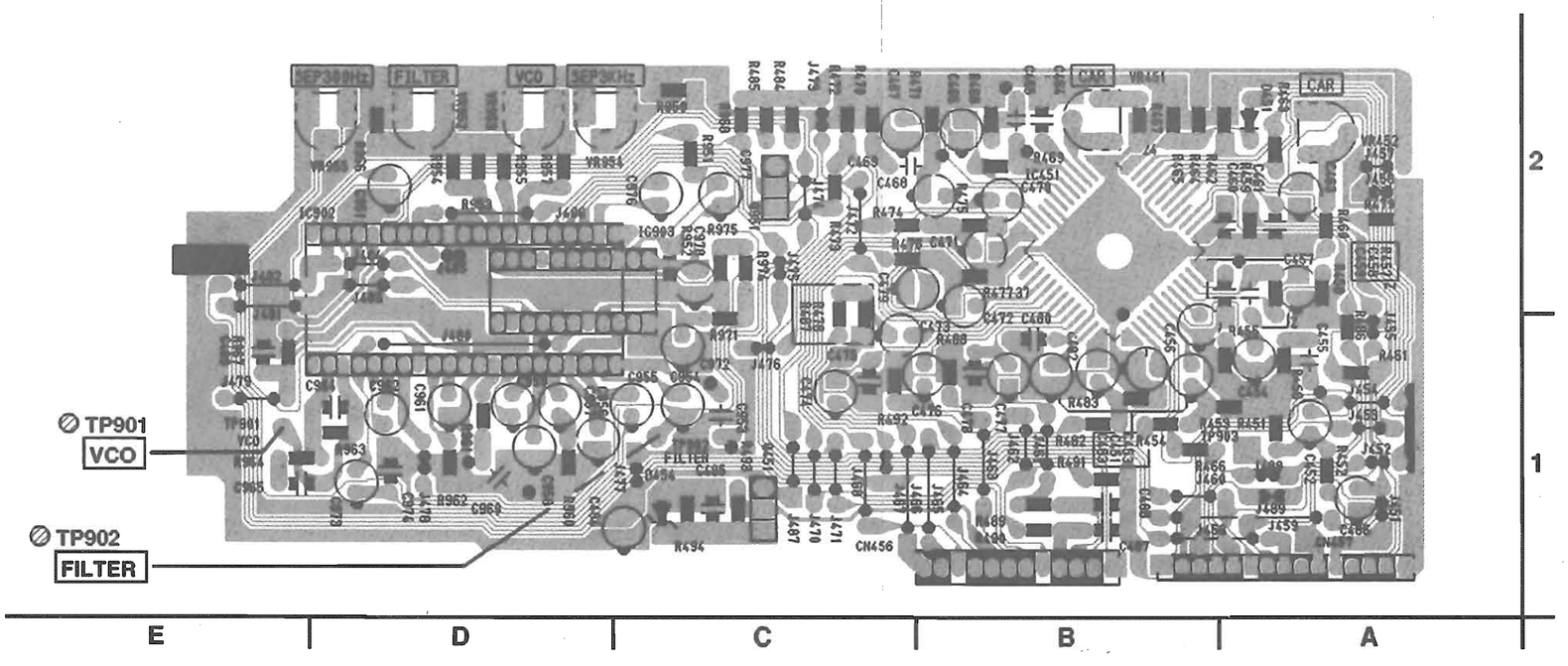


BN6002F01011

Hi-Fi Audio CBA Top View



Hi-Fi Audio CBA Bottom View



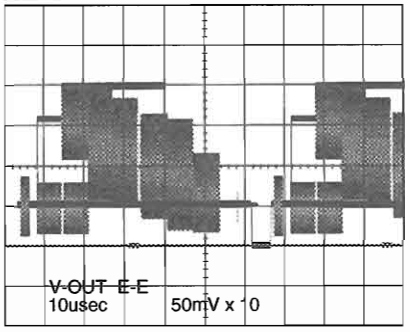
BH7400F0101

Hi-Fi AUDIO CBA

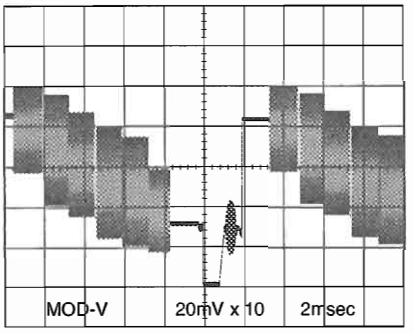
Ref No.	Position
ICS	
IC451	B-2
IC902	D-2
TRANSISTORS	
Q451	C-1
Q951	C-2
CONNECTORS	
CN456	A-1
CN457	B-1
VARIABLE RESISTORS	
VR451	B-2
VR452	A-2
VR952	D-2
VR953	D-2
VR954	D-2
VR955	E-2
TEST POINTS	
TP901	E-1
TP902	C-1

WAVEFORMS

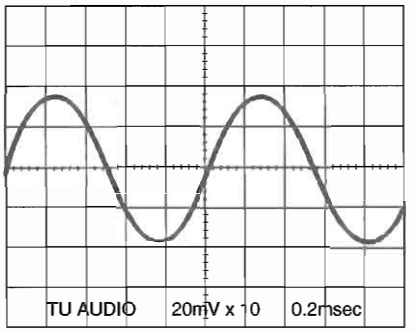
WF 1



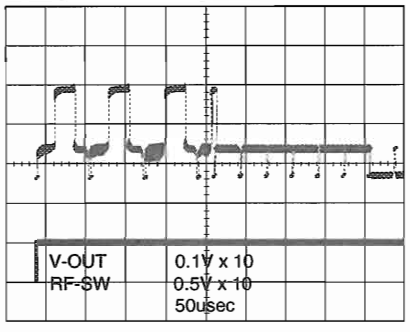
WF9



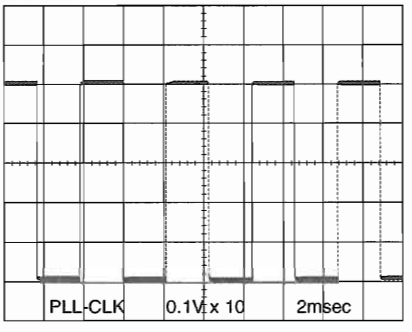
WF13



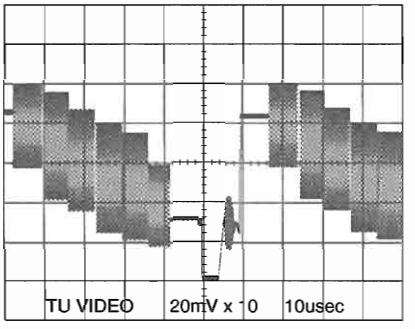
WF1 UPPER WF2 LOWER



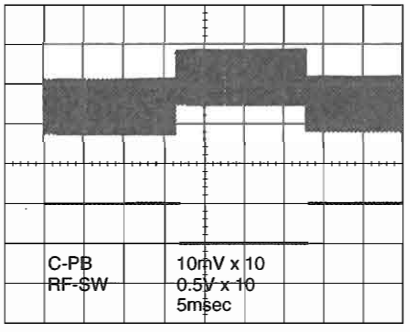
WF10



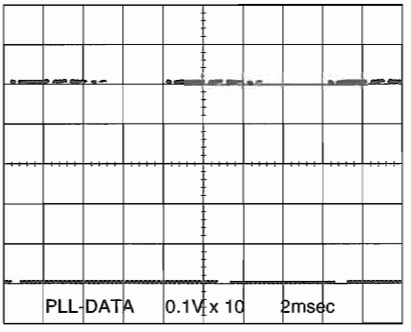
WF14



WF5



WF11



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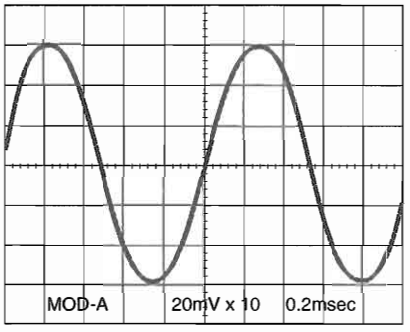

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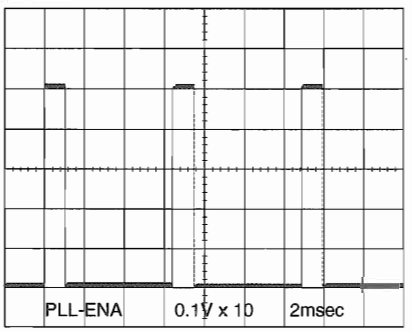
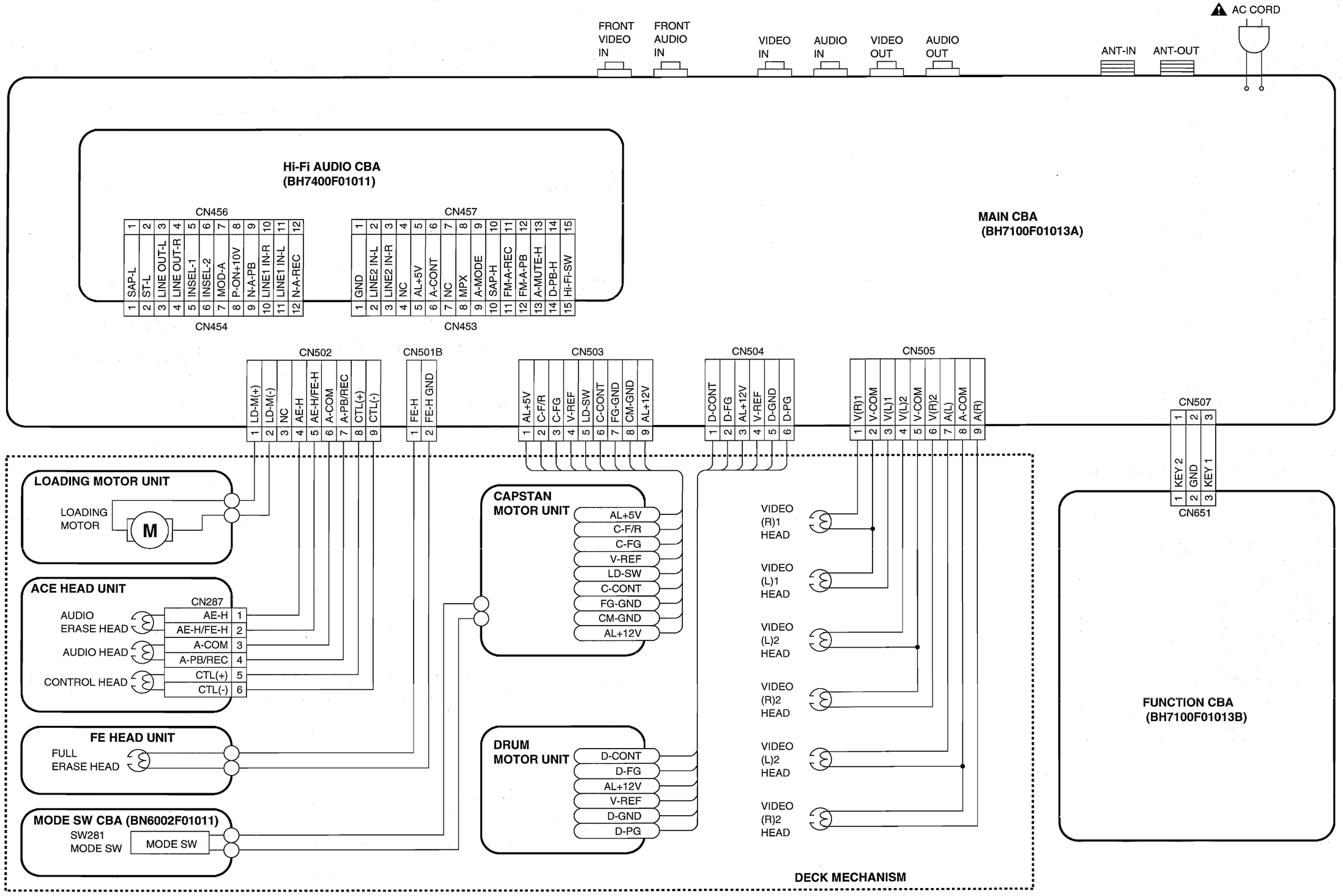


WIRING DIAGRAM



SYSTEM CONTROL TIMING CHARTS

Mode SW : LD-SW

LD-SW Position detection A/D Input voltage Limit (Calculated voltage)	Symbol
3.76V~4.50V (4.12V)	EJ
4.51V~5.00V (5.00V)	CL
0.00V~0.25V (0.00V)	SB
1.06V~1.50V (1.21V)	TL
0.66V~1.05V (0.91V)	FB
1.99V~2.60V (2.17V)	SF
1.51V~1.98V (1.80V)	AU
3.20V~3.75V (3.40V)	AL
0.26V~0.65V (0.44V)	SS
4.51V~5.00V (5.00V)	GC
2.61V~3.19V (2.97V)	RS

Note:

EJ → RS : Loading FWD (LM-FWD "H", LM-REV "L")

RS → EJ : Loading REV (LM-FWD "L", LM-REV "H")

Stop (A) = Loading

Stop (B) = Unloading

Note :

Symboi	Loading Status
EJ	Eject
CL	Eject ~ REW Reel
SB	REW Reel ~ Stop(B)
TL	Stop(B) ~ Brake Cancel
FB	Brake Cancel ~ FF / REW
SF	FF / REW ~ Stop(A)
AU	Stop(A) ~ Play / REC
AL	Play / REC ~ Still / Slow
SS	Still / Slow ~ Capstan Reversal
GC	Capstan Reversal ~ RS (REW Search)
RS	RS (REW Search)

Still/Slow Control

Frame Advance Timing Chart

1) SP MODE

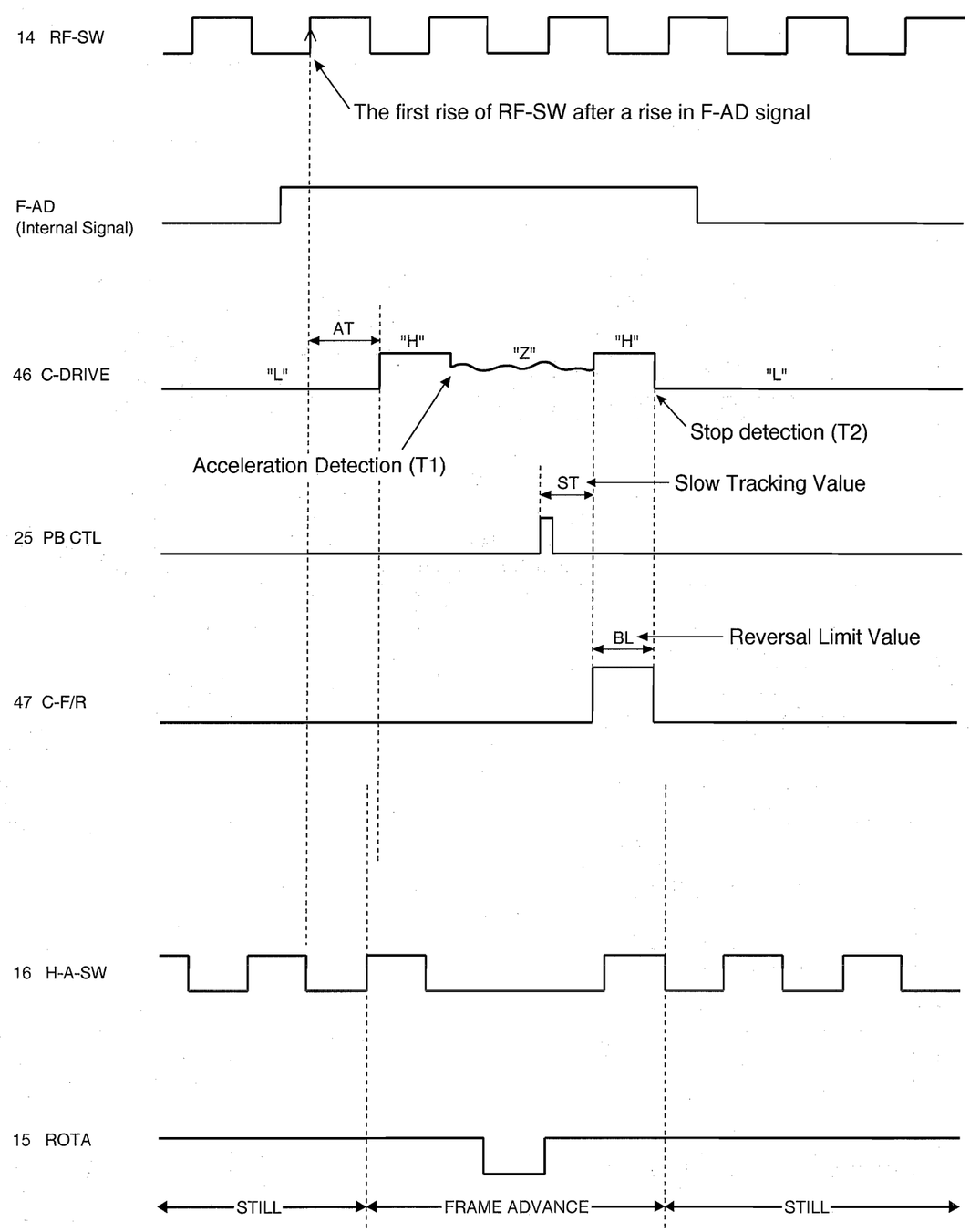


Fig.1

2) LP/SLP MODE

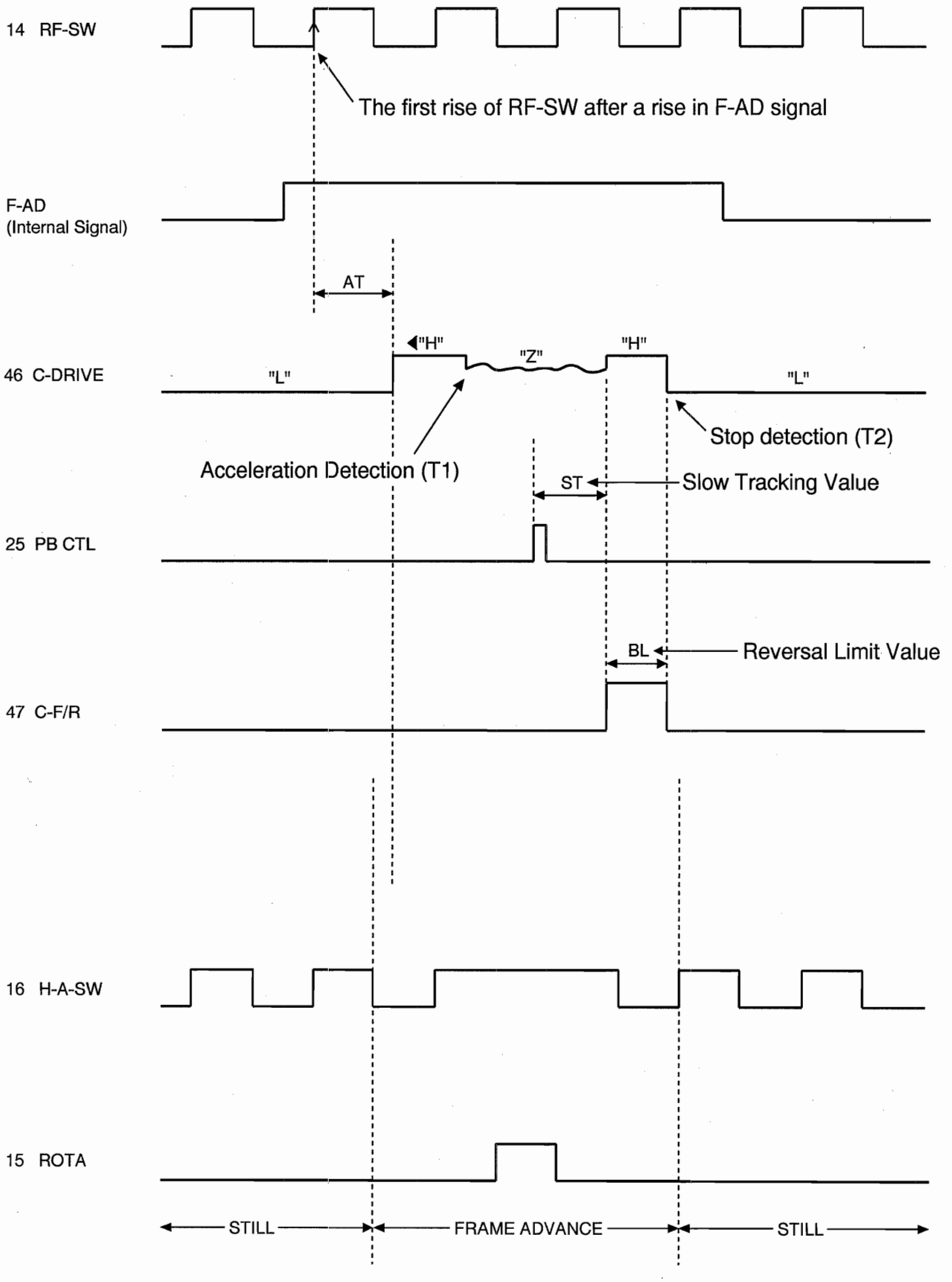


Fig.2

1. EJECT (POWER-OFF) → CASSETTE IN (POWER-ON) → STOP (B) → STOP (A) → PLAY → RS→ FS → PLAY → STILL (SLOW) → PLAY → STOP (B)

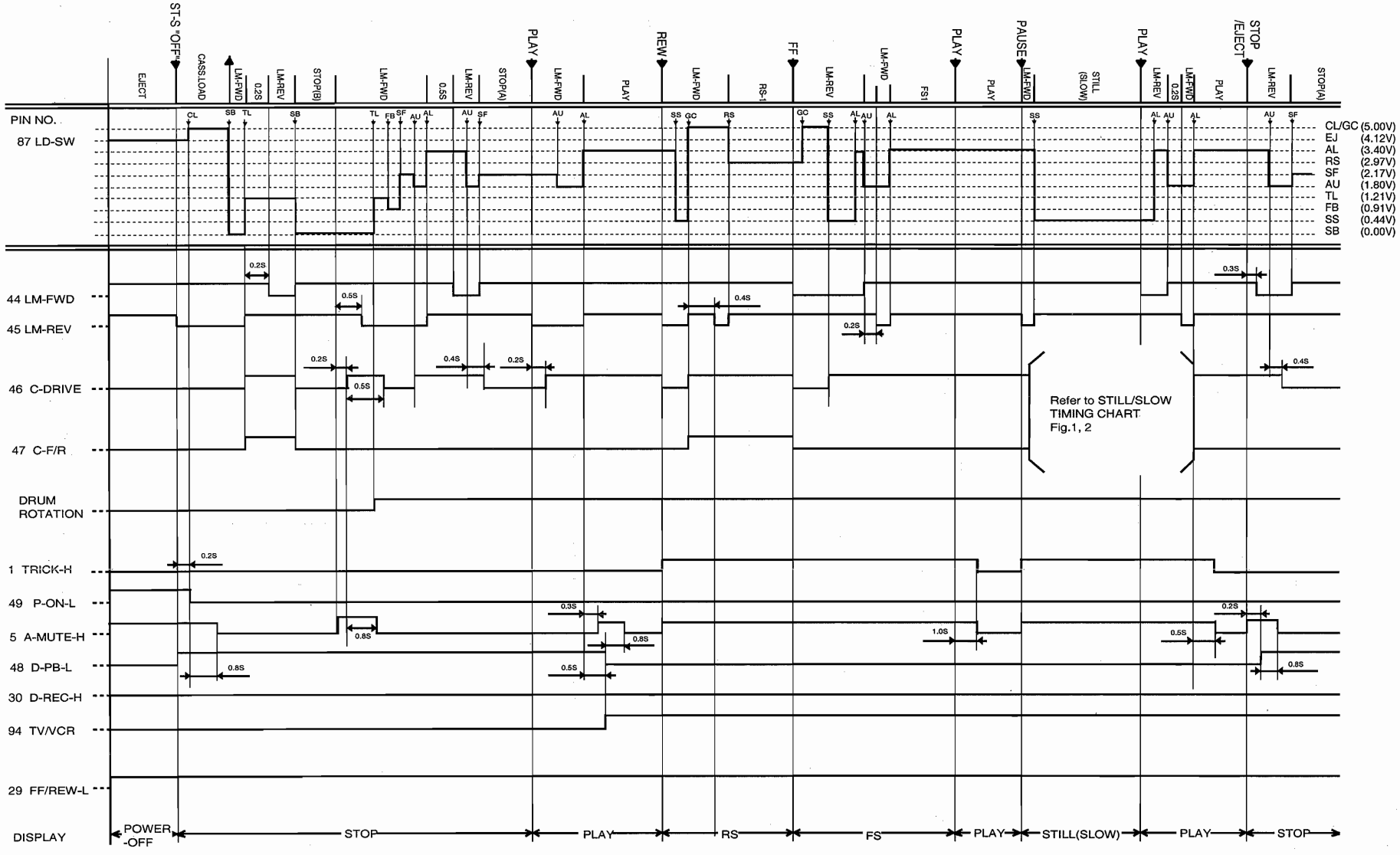


Fig.3

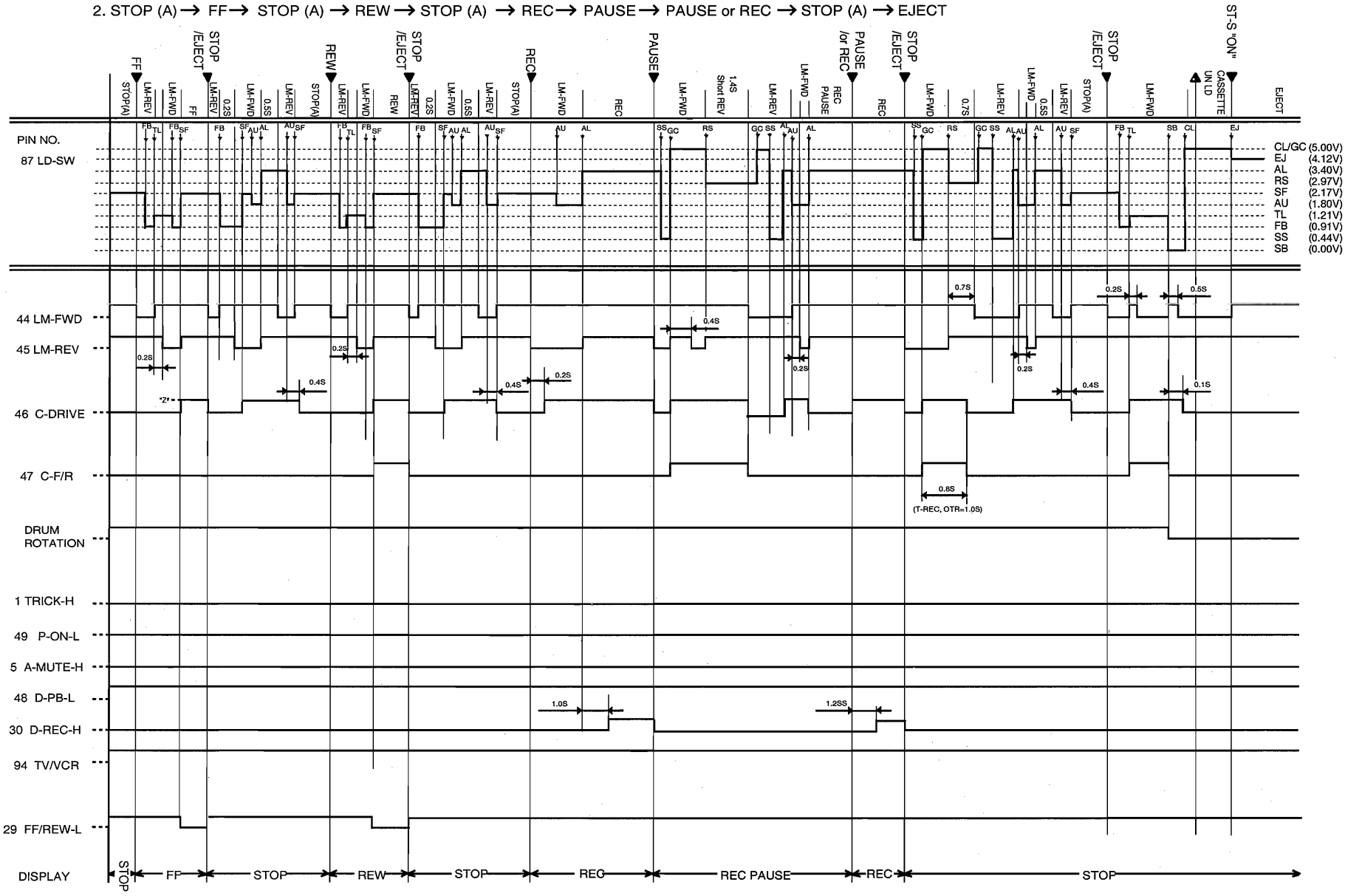

2. STOP (A) → FF → STOP (A) → REW → STOP (A) → REC → PAUSE → PAUSE or REC → STOP (A) → EJECT
ST-S "ON"
PIN NO.
87 LD-SW
CL/GC (5.00V)
EJ (4.12V)
AL (3.40V)
RS (2.97V)
SF (2.17V)
AU (1.80V)
TL (1.21V)
FB (0.91V)
SS (0.44V)
SB (0.00V)
44 LM-FWD
45 LM-REV
46 C-DRIVE
47 C-F/R
DRUM ROTATION
1 TRICK-H
49 P-ON-L
5 A-MUTE-H
48 D-PB-L
30 D-REC-H
94 TV/VCR
29 FF/REW-L
DISPLAY
STOP
FF
STOP
REW
STOP
REC
REC PAUSE
REC
STOP
0.8S
(T-REC, OTR=1.0S)

Fig.4

IC PIN FUNCTION DESCRIPTION

Comparison Chart of Models and Marks

MODEL	MARK
SE447SG	A
LV448HG	B
LV446G	C

IC501 (SERVO / SYSTEM CONTROL IC)

"H" ≥ 4.5V, "L" ≤ 1.0V

Pin No.	MARK	IN/ OUT	Signal Name	Function	Active Level
1		OUT	TRICK-H	Special Play Back "H" Output	H
2		OUT	SAP-H	SAP "H" Output	H/L
3		OUT	C-CONT	Capstan Motor Control Signal	PWM
4		OUT	D-CONT	Drum Motor Control Signal	PWM
5		OUT	A-MUTE-H	Audio Mute Signal Output	H
6		OUT	SLP-H	SLP-H Output	H/L
7		OUT	LP/ SLP-H	LP/EP-H Output	H/L
8		OUT	D-PB-H	D-PB-H Output	H
9		OUT	OSD-BLUE-L	Blue Back Control Signal Output (ON= "L")	L
10		OUT	D-V SYNC	Dummy V-Sync Output	H/Hi-Z
11		IN	REMOC-ON	Remote Control Input Signal	L
12		IN	S-REEL	Supply Reel Rotation Input Signal	PULSE
13		OUT	Hi-Fi-SW	Hi-Fi-SW Output	H/L
14		OUT	RF-SW	Video Head Switching Pulse	H/L
15		OUT	ROTA	Color Phase Rotary Changeover Signal	H/L
16		OUT	H-A-SW	H-A-SW Output	H/L
17		IN	H-A-COMP	Head Amp Comparator Input	H/L
18		IN	T-REEL	Take Up Reel Rotation Input Signal	PULSE
19		–	N.U.	–	–
20		OUT	REC-CTL	Capstan Motor Control Pulse Output at Rec Mode	H/L
21		OUT	STILL / SLOW-L	STILL/SLOW "L" Output	H/L
22		IN	C-FG	Capstan Frequency Generator Signal Input	PULSE
23		IN	D-PG	Drum Pulse Generator Input	PULSE
24		IN	D-FG	Drum Frequency Generator Input	PULSE
25		IN	PB-CTL	Capstan Motor Control Pulse Input at Playback Mode	PULSE
26		–	Vcc	Vcc	–
27		OUT	SOFT-H	* Rental Position Mode Switching Signal (Rental Position = "H"	H
28		OUT	OSD-CS	On Screen Display IC Control Chip Select Signal	L
29		OUT	FF/REW-L	FF/REW "L" Output	L
30		OUT	D-REC-H	D-REC Output	H
31		OUT	ST-IN	TUNER STEREO Input	–

---- This function enables you to improve the picture quality when playing back worn cassettes such as those rented from a video shop.

Pin No.	MARK	IN/ OUT	Signal Name	Function	Active Level
32		OUT	SAP-IN	TUNER SAP Input	–
33		IN	P-DOWN-L	Power Down Detection Input	L
34		IN	A-MODE	Audio Mode Input "Hi-Fi"="H", "Mono"="L" (P.B MODE)	H/L
35		–	GND	–	–
36		–	GND	–	–
37		IN	RESET	System Reset Signal (Usually= "H"/Reset= "L")	L
38		–	XIN	Main Clock 14.31818MHz	–
39		–	Xout	Main Clock	–
40		–	GND	–	–
41		–	Vss	Vss	–
42		–	XC IN	Sub Clock 32 KHz	–
43		–	XC OUT	Sub Clock 32 KHz	–
44		OUT	LM-FWD	Loading Motor Forward Control Output	H
45		OUT	LM-REV	Loading Motor Reverse Control Output	H
46		OUT	C-DRIVE	Capstan Drive Output	H/Hi-Z
47		OUT	C-F/R	Capstan F/R Output	H/L
48		OUT	D-PB-L	D-PB-L Output	L
49		OUT	P-ON-L	Power-ON Control Signal	L
50		–	N.U.	–	–
51		–	N.U.	–	–
52		–	N.U.	–	–
53		–	N.U.	–	–
54		–	N.U.	–	–
55		–	N.U.	–	–
56		–	N.U.	–	–

Pin No.	MARK	IN/ OUT	Signal Name	Function	Active Level
57	A,C	OUT	TIMER LED	Timer Stand by, Rec Mode LED Indicator Output	H/L
	B	–	N.U.	–	–
58	A,C	OUT	REC LED	REC Mode LED Indicator Output	H/L
	B	–	N.U.	–	–
59	A,C	OUT	REC LED	REC Mode LED Indicator Output	H/L
	B	–	N.U.	–	–
60	A,C	OUT	TIMER LED	Timer Stand by, Rec Mode LED Indicator Output	H/L
	B	–	N.U.	–	–
61	A,C	OUT	TIMER LED	Timer Stand by, Rec Mode LED Indicator Output	H/L
	B	OUT	G1	Display Digit Output	H/L
62	A,C	–	N.U.	–	–
	B	OUT	G2	Display Digit Output	H
63	A,C	–	N.U.	–	–
	B	OUT	G3	Display Digit Output	H
64	A,C	–	N.U.	–	–
	B	OUT	G4	Display Digit Output	H
65	A,C	–	N.U.	–	–
	B	OUT	a	Display Segment Output	H
66	A,C	–	N.U.	–	–
	B	OUT	b	Display Segment Output	H
67	A,C	–	N.U.	–	–
	B	OUT	c	Display Segment Output	H
68	A,C	OUT	CASSE-TTE IN LED	Cassette IN/OUT LED Indicate Output	H/L
	B	OUT	d	Display Segment Output	H

Pin No.	MARK	IN/ OUT	Signal Name	Function	Active Level
69	A,C	OUT	CASSE-TTE IN LED	Cassette IN/OUT LED Indicate Output	H/L
	B	OUT	f	Display Segment Output	H
70	A,C	–	N.U.	–	–
	B	OUT	g	Display Segment Output	H
71	A,C	OUT	VCR LED	TV/VCR LED Indicate Output	H/L
	B	OUT	h	Display Segment Output	H
72	A,C	OUT	VCR LED	TV/VCR LED Indicate Output	H/L
	B	OUT	i	Display Segment Output	H
73	A,C	–	N.U.	–	–
	B	OUT	j	Display Segment Output	H
74	A,C	OUT	VCR LED	TV/VCR LED Indicate Output	H/L
	B	OUT	e	Display Segment Output	H
75		–	-28V	-28V	–
76		–	Vcc	Vcc	–
77		OUT	PLL/ OSD-DATA	Tuner Control Signal (Data)/On-Screen IC Control(Data)	H/L
78		–	N.U.	–	–
79		OUT	PLL/OSD -CLK	Tuner Control Signal (Clock)/On-Screen IC Control(Clock)	–
80		OUT	PLL-ENA	Tuner Control Signal (Enable)	H
81		–	Vcc	Vcc	–
82		–	VREF	Servo Reference Voltage	–
83		OUT	A-CONT	Audio Control 1 Output	H/L
84		–	N.U.	–	–
85		IN	KEY IN-1	A/D Key Data Signal Input	A/D
86		IN	KEY IN-2	A/D Key Data Signal Input	A/D
87		IN	LD-SW	Loading SW A/D Input	A/D
88		IN	AFC	Tuner AFC Voltage Signal Input	A/D
89		IN	PG-DELAY / TEST	RF-SW Signal Delay Adjust Voltage Input	A/D
90		IN	V-ENV / REC-SW	Video DC Envelope Voltage Input /Recording Safety SW Detect	A/D
91		IN	END-S	Tape End Position Detect	A/D
92		IN	ST-S	Tape Start Position Detect	A/D
93		IN	C-SYNC	Composite Sync Signal Input	PULSE
94		OUT	TV/VCR	RF Conv. ON/OFF Signal	H/L
95	A,B	IN/ OUT	I2C BUS DATA	Memory IC Control Data	H/L
	C	–	N.U.	–	–
96	A,B	OUT	I2C BUS CLOCK	Memory IC Control Clock	H/L
	C	–	N.U.	–	–
97		–	N.U.	–	–
98		–	N.U.	–	–
99		OUT	INSEL-2	Input Selector Control Signal 2	H/L
100		OUT	INSEL-1	Input Selector Control Signal 1	H/L

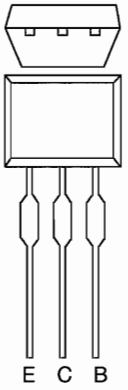
Notes: Abbreviation for Active Level

PWM ---------- Pulse Wide Modulation

A/D ---------- Analog - Digital Converter

LEAD IDENTIFICATIONS

KSA1175 (Y, G)
KSR2203



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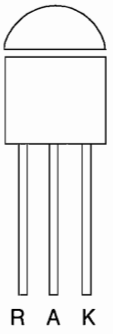
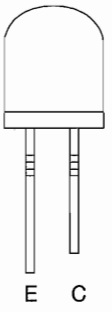
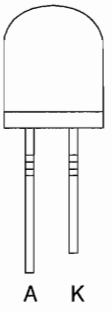
KIA431



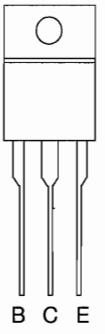
PT380FAB
ST-316R2-B

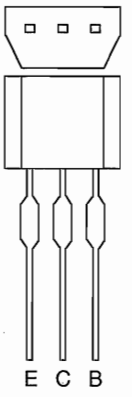


SLR-938CV-7
SLR-938CV-A



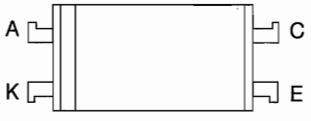
2SC4953



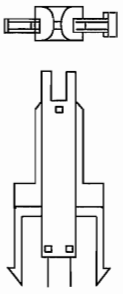


2SA1317 (S, T)
2SA1346
2SA608SP (E, F, G)
2SC2839 (E, F)
2SC3576
2SC3400
2SC536SP (E, F, G)
KRA103M
KRC103M
KSC2785(Y, G, L)
KSR1203
KTA1266 (Y, GR)
KTA1267 (Y, GR)
KTC3193 (Y)
KTC3199 (Y, GR, BL)

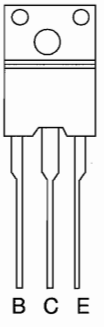
PC-17T1
PC817 (B, AB, A)
PS2501-1(D, H, L, M, W)
TLP521-1 (GR)



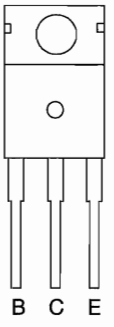
SG-231

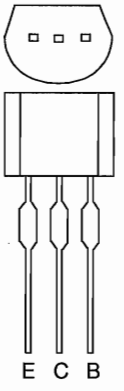


2SC4418



KSC5020 (O, R)

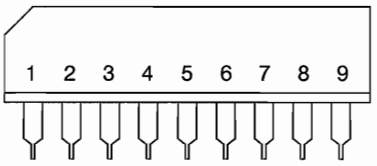


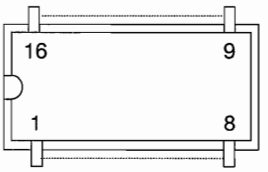


2SC3331 (T, U)
2SC4204-AA
2SD734F-NP-AQ
2SD734G-NP-AQ

Note:
A: Anode
K: Cathode
E: Emitter
C: Collector
B: Base
R: Reference

TA7291S





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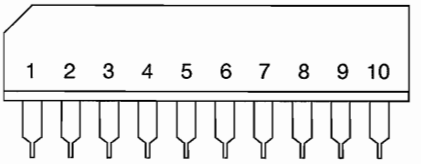
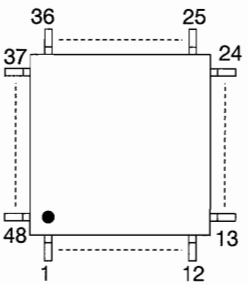
UPD4052BC

LB1641



LA72603M



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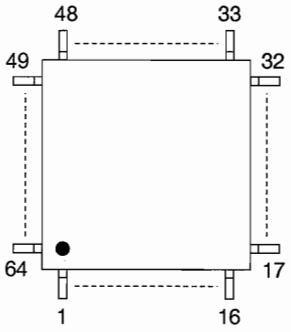
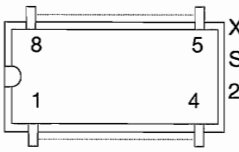
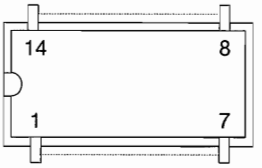




X24C01AP
ST24C01CB
24LC01B/P



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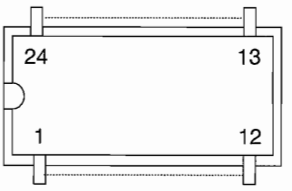
LM339N
KIA339P
NJM2901N
NJM324D

LC74723-9068



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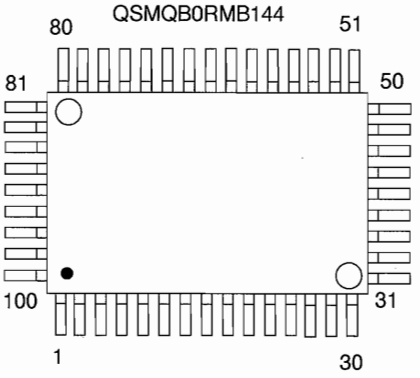
QSMQB0RMB144



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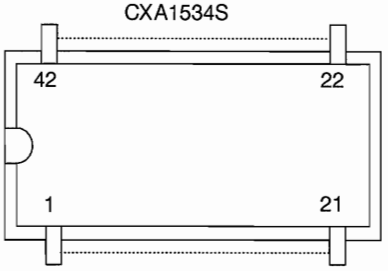
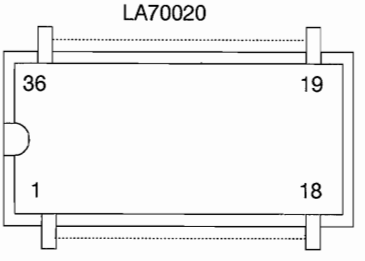


LA70020



DECK MECHANISM SECTION

4-Head Hi-Fi VIDEO CASSETTE RECORDER

LV446G / LV448HG / SE447SG

Sec. 2: Deck Mechanism Section

- **Standard Maintenance**
- **Alignment for Mechanism**
- **Disassembly/Assembly of Mechanism**
- **Front Loading Assembly**
- **Alignment Procedures of Mechanism**

TABLE OF CONTENTS

Standard Maintenance 2-1-1
Service Fixtures and Tools 2-2-1
Mechanical Alignment Procedures 2-3-1
Disassembly / Assembly Procedures of Deck Mechanism 2-4-1
Front Loading Assembly 2-4-8
Alignment Procedures of Mechanism 2-4-10

STANDARD MAINTENANCE

Service Schedule of Components

H: Hours ❍: Check ●: Change

Deck		Periodic Service Schedule			
Ref. No.	Part Name	1,000 H	2,000 H	3,000 H	4,000 H
B2	Cylinder Assembly	❍	●	❍	●
B3	Loading Motor Assembly			◐	
B8	Pulley Assembly		●		●
B21	Loading Belt		●		●
B27	Tension Lever Assembly		●		●
B31	ACE Head Assembly			◐	
B32, B339	Reel Base Assembly			◐	
B37	Capstan Motor		●		●
B52	Capstan Belt		●		●
B54	Spring Plate Assembly			◐	
*B73	FE Head CBA			◐	
B132	Clutch Assembly		●		●
B133	Idler Assembly		●		●
B410	Pinch Roller Arm Assembly		●		●
B413	Main Brake T Assembly		●		●
B414	Main Brake S Assembly		●		●

Notes:

1. Clean all parts for the tape transport (Upper Drum with Video Head / Pinch Roller / Audio Control Head / Full Erase Head) using 90% Isopropyl Alcohol.
2. After cleaning the parts, do all DECK ADJUSTMENTS.
3. For the reference numbers listed above, refer to Deck Exploded Views.

   * B73 ------ VCR Model only

Cleaning

Cleaning of Video Head

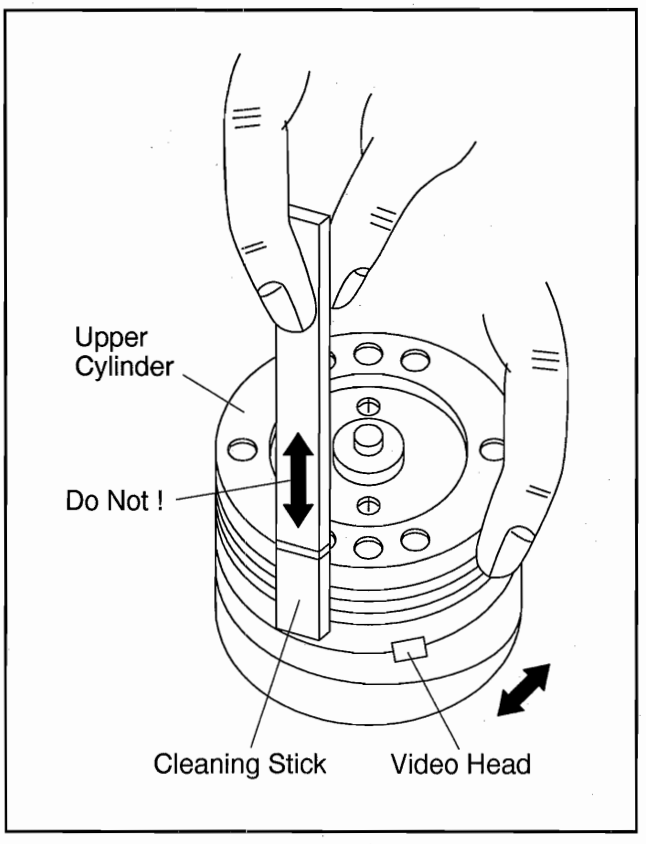
Clean the head with a head cleaning stick or chamois cloth.

Procedure

1. Remove the top cabinet.
2. Put on a glove (thin type) to avoid touching the upper and lower drum with your bare hand.
3. Put a few drops of 90% Isopropyl alcohol on the head cleaning stick or on the chamois cloth and, by slightly pressing it against the head tip, turn the upper drum to the right and to the left.

Notes:

1. The video head surface is made of very hard material, but since it is very thin, avoid cleaning it vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit.
3. Do not reuse a stained head cleaning stick or a stained chamois cloth.



Cleaning of Audio Control Head

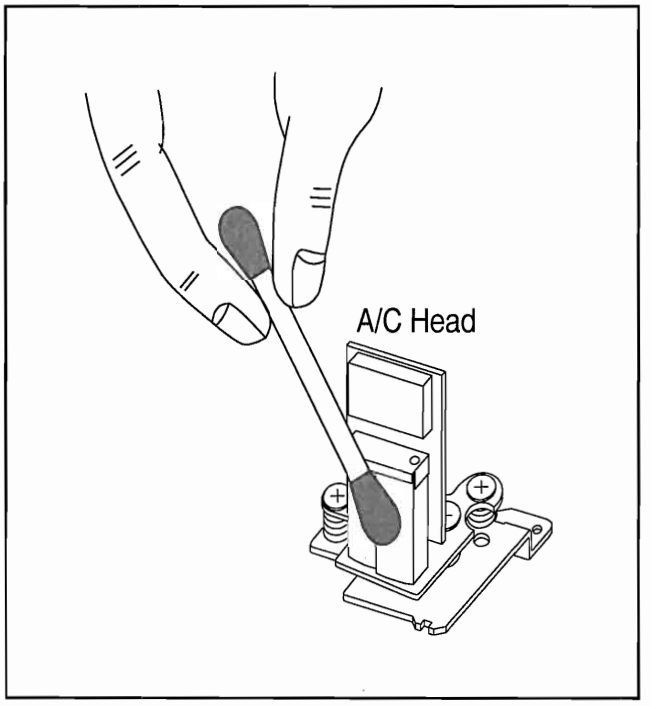
Clean the head with a cotton swab.

Procedure

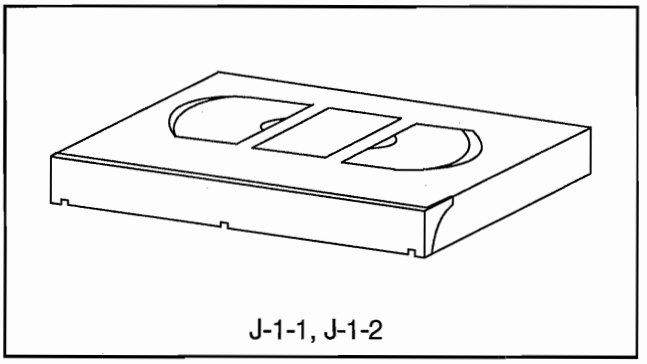
1. Remove the top cabinet.
2. Dip the cotton swab in 90% isopropyl alcohol and clean the audio control head. Be careful not to damage the upper drum and other tape running parts.

Notes:

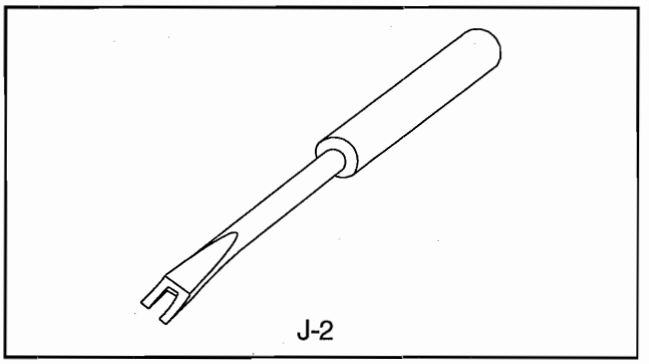
1. Avoid cleaning the audio control head vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit or damage may occur.



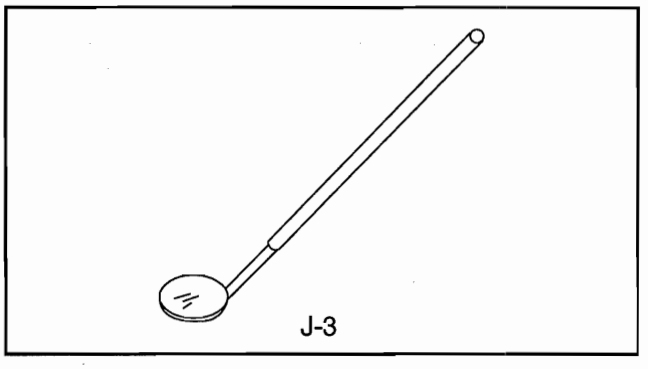
SERVICE FIXTURE AND TOOLS



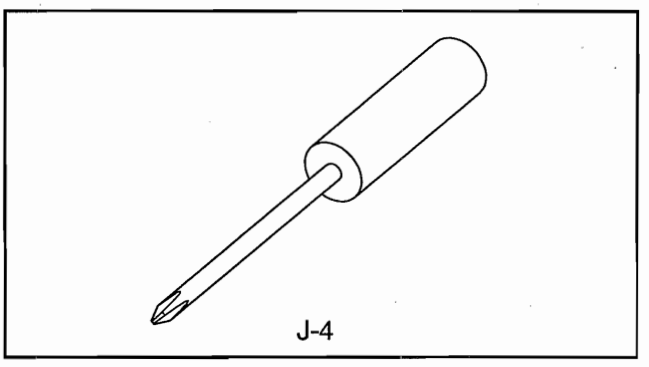
J-1-1, J-1-2



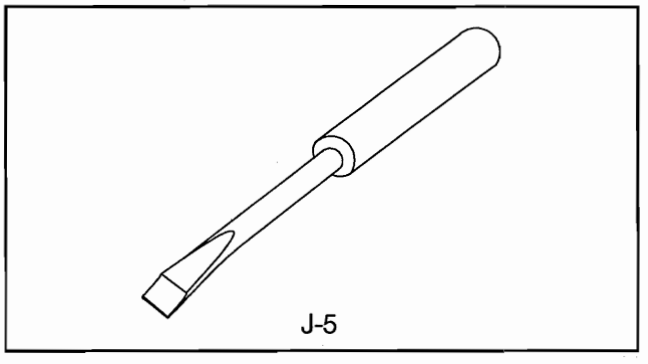
J-2



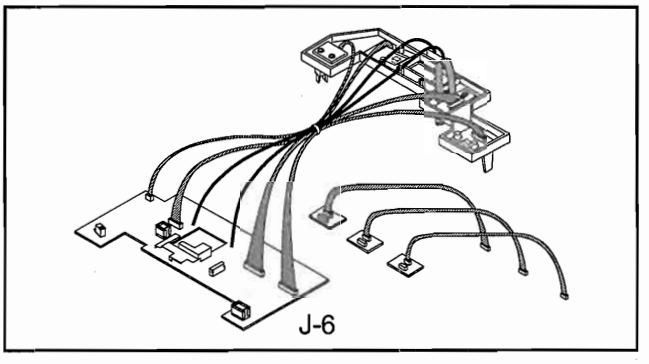
J-3



J-4



J-5



J-6

Ref. No.	Name	Part No.	Adjustment
J-1-1	Alignment Tape	FL8A	Head Adjustment of Audio Control Head
J-1-2	Alignment Tape	FL8N (2Head only) FL8NW (4Head only)	Azimuth and X Value Adjustment of Audio Control Head / Adjustment of Envelope Waveform
J-2	Guide Roller Adj.Screwdriver	FSJ-0006	Guide Roller
J-3	Mirror	FSJ-0004	Tape Transportation Check
J-4	Azimuth Adj.Screwdriver +	Available Locally	A/C Head Height
J-5	X Value Adj.Screwdriver -	Available Locally	X Value
J-6	U15 Deck Extension Cable	N1090XA	All Mechanical and Electrical Adjustments

Note:
Before starting any adjustment, take the Deck Assembly out of the cabinet and use J-6 to connect the Deck Assembly with the Main CBA.

MECHANICAL ALIGNMENT PROCEDURES

Explanation of alignment for the tape to correctly run starts on the next page. Refer to the information below on this page if a tape gets stuck, for example, in the mechanism due to some electrical trouble of the unit.

Service Information

A. Method for Manual Tape Loading/Unloading

To load a cassette tape manually:

1. Disconnect the AC plug.
2. Remove the Top Cover.
3. Insert a cassette tape. Though the tape will not be automatically loaded, make sure that the cassette tape is all the way in at the inlet of the Cassette Holder. To confirm this, lightly push the cassette tape further in and see if the tape comes back out, by a spring motion, just as much as you have pushed in.
4. Turn the Pulley Assembly in the appropriate direction shown in Fig. M1 until the cassette tape is fully loaded. By turning the Pulley Assembly, you are turning the cam indicated in this figure. However, movement of the cam will be very slow. Allow a minute or two to complete this task.

To unload a cassette tape manually:

1. Disconnect the AC plug.
2. Remove the Top Cover.
3. Turn the Pulley Assembly in the appropriate direction shown in Fig. M1 to unload the cassette tape. When turning the Pulley Assembly, please be aware that this is a long process and the cassette will not start getting unloaded instantaneously. Within this long process, before the cassette actually starts getting unloaded, there is a time period during which the moving guide assemblies slide back to their original positions shown in Fig. M1. However, the tape will be left wound around the cylinder. To put the tape back into the cassette, gently turn the Capstan Motor in the direction shown in Fig. M2. Make sure that the tape is completely placed back in the cassette before the cassette starts getting unloaded. Otherwise the tape hanging out will be caught and damaged by the lid of the cassette when it closes.
   By turning the Pulley Assembly, you are turning the cam indicated in Fig. M1. As stated, movement of the cam will be very slow. Allow a minute or two to complete this task.

B. Method to place the Cassette Holder in the tape-loaded position without a cassette tape

1. Disconnect the AC Plug.
2. Remove the Top Cover.
3. Turn the Pulley Assembly in the appropriate direction shown in Fig. M1. Release the locking tabs shown in Fig. M1 and continue turning the Pulley Assembly until the Cassette Holder comes to the tape-loaded position. Allow a minute or two to complete this task.

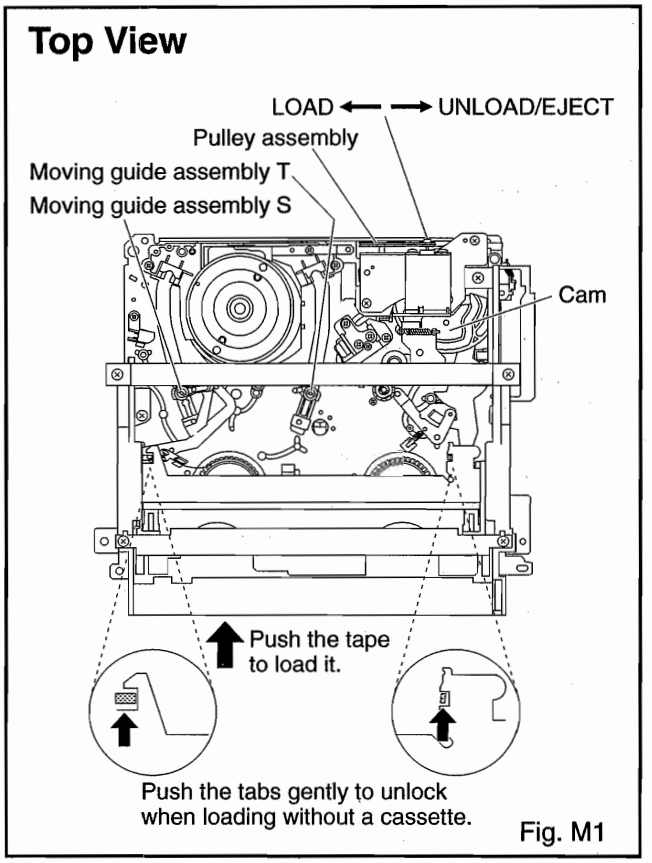


Fig. M1

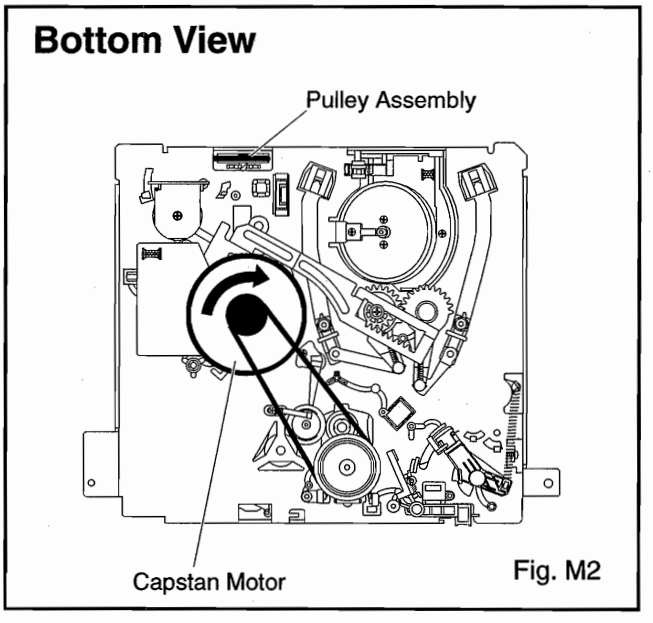


Fig. M2

1. Tape Interchangeability Alignment

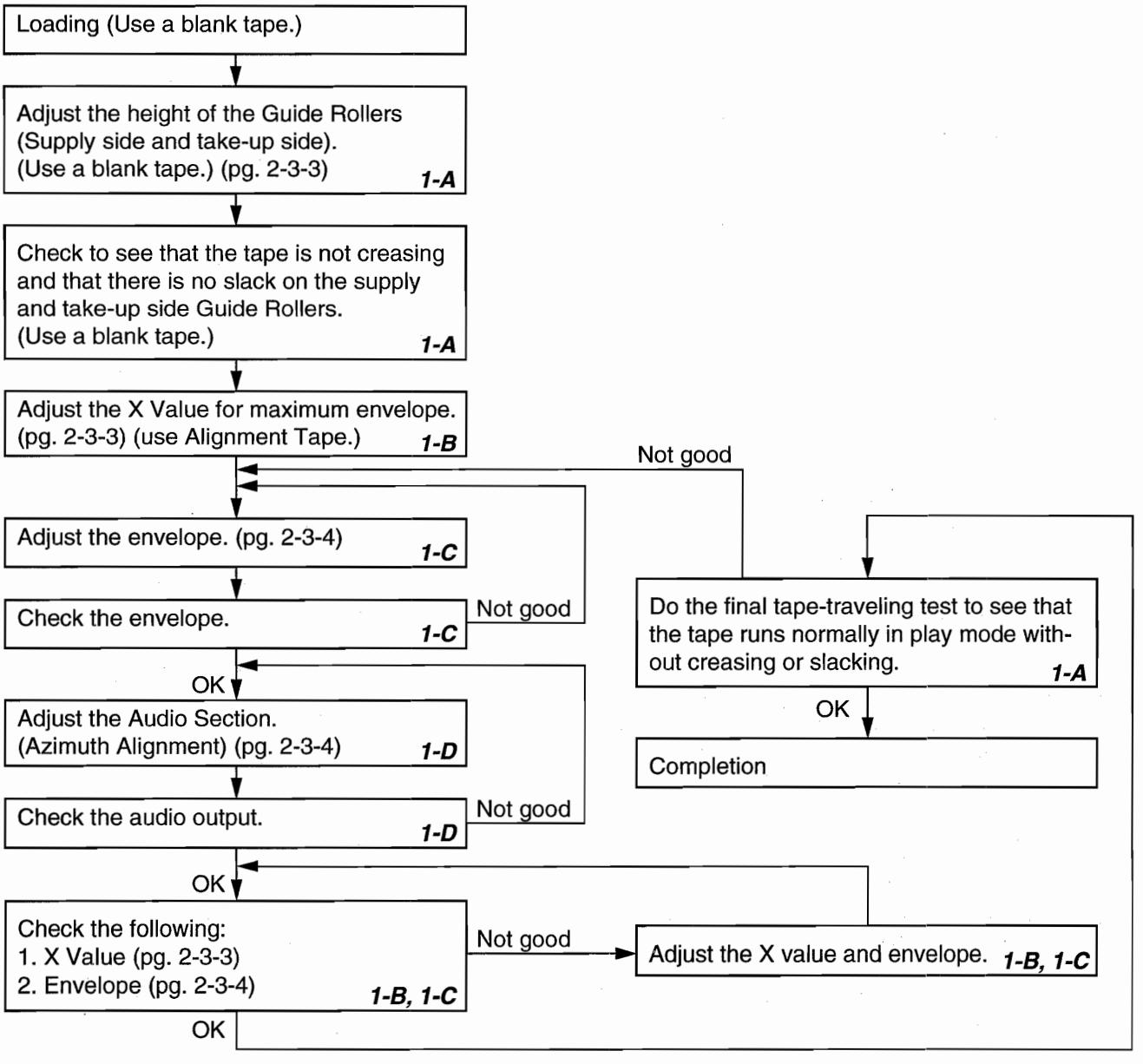
Note: To do these alignment procedures, make sure that the Tracking Control Circuit is set to the center position every time a tape is loaded or unloaded. (Refer to page 2-3-4, procedure 1-C, step 2.)

Equipment required:

Dual Trace Oscilloscope
VHS Alignment Tape (FL8NW)
Guide Roller Adj. Screwdriver
X-Value Adj. Screwdriver

Note: Before starting this Mechanical Alignment, do all Electrical Adjustment procedures.

Flowchart of Alignment for tape traveling


Loading (Use a blank tape.)
Adjust the height of the Guide Rollers (Supply side and take-up side). (Use a blank tape.) (pg. 2-3-3) 1-A
Check to see that the tape is not creasing and that there is no slack on the supply and take-up side Guide Rollers. (Use a blank tape.) 1-A
Adjust the X Value for maximum envelope. (pg. 2-3-3) (use Alignment Tape.) 1-B
Not good
Adjust the envelope. (pg. 2-3-4) 1-C
Check the envelope. 1-C
Not good
OK
Adjust the Audio Section. (Azimuth Alignment) (pg. 2-3-4) 1-D
Check the audio output. 1-D
Not good
OK
Check the following:
1. X Value (pg. 2-3-3)
2. Envelope (pg. 2-3-4) 1-B, 1-C
Not good
Adjust the X value and envelope. 1-B, 1-C
OK
Do the final tape-traveling test to see that the tape runs normally in play mode without creasing or slacking. 1-A
OK
Completion

1-A. Preliminary/Final Checking and Alignment of Tape Path

Purpose:

To make sure that the tape path is well stabilized.

Symptom of Misalignment:

If the tape path is unstable, the tape will be damaged.

Note: Do not use an Alignment Tape for this procedure. If the unit is not correctly aligned, the tape may be damaged.

1. Play back a blank cassette tape and check to see that the tape runs without creasing at Guide Rollers [2] and [3], and at points A and B on the lead surface. (Refer to Fig M3 and M4.)
2. If creasing is apparent, align the height of the guide rollers by turning the top of Guide Rollers [2] and [3] with a Guide Roller Adj. Screwdriver. (Refer to Fig. M3 and M5.)
   Note: Beneath each Guide Roller, there is a small screw. (Refer to Fig. M5.) This screw works to apply adequate torque to the shaft of each Guide Roller so that the Guide Roller turns properly. Even when adjusting the height of the Guide Roller(s), do not touch these two small screws.
3. Check to see that the tape runs without creasing at Take-up Guide Post [4] or without snaking between Guide Roller [3] and ACE Head. (Fig. M3 and M5)
4. If creasing or snaking is apparent, adjust the Tilt Adj. Screw of the ACE Head. (Fig. M6)

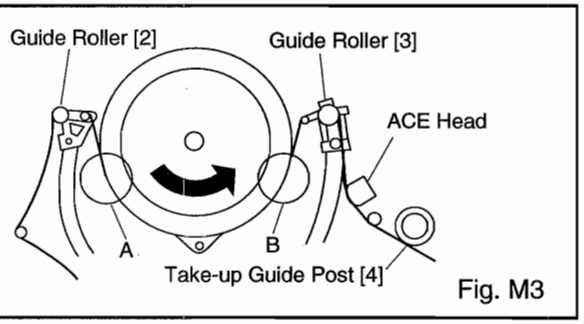


Fig. M3

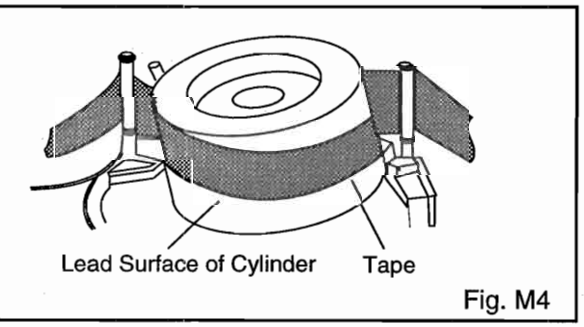


Fig. M4

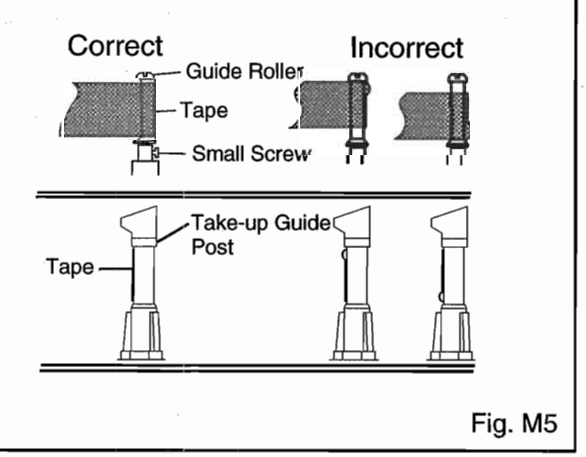


Fig. M5

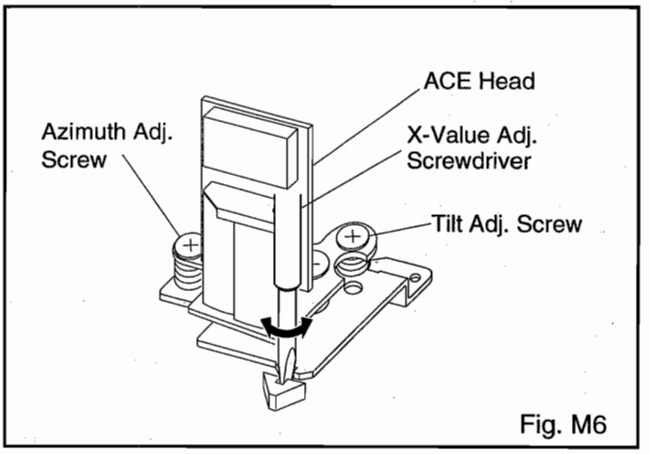


Fig. M6

1-B. X Value Alignment

Purpose:

To align the Horizontal Position of the Audio/Control/Erase Head.

Symptom of Misalignment:

If the Horizontal Position of the Audio/Control/Erase Head is not properly aligned, maximum envelope cannot be obtained at the Neutral position of the Tracking Control Circuit.

1. Connect the oscilloscope to TP301 (C-PB) and TP504 (CTL) on the Main CBA. Use TP302 (RF-SW) as a trigger.
2. Play back the Gray Scale of the Alignment Tape (FL8NW) and confirm that the PB FM signal is present.
3. Set the Tracking Control Circuit to the center position by pressing CH UP and DOWN buttons on VCR simultaneously. (Refer to note on bottom of page 2-3-4.)
4. Use the X-Value Adj. Screwdriver so that the PB FM signal at TP301 (C-PB) is maximum. (Fig. M6)
5. Press CH UP button on VCR until CTL waveform is shifted by approx. +2msec. Make sure that the envelope is simply attenuated (shrinks in height) during this process so that you will know the envelope has been at its peak.

6. Press CH DOWN button on VCR until CTL waveform is shifted from its original position (not the position achieved in step 5 of just above, but the position of CTL waveform in step 4) by approximately -2msec. Make sure that the envelope is simply attenuated (shrinks in height) once CTL waveform passes its original position and is further brought in the minus direction.
7. Set the Tracking Control Circuit to the center position by pressing CH UP and DOWN buttons on VCR simultaneously.

1-C. Checking/Adjustment of Envelope Waveform

Purpose:

To achieve a satisfactory picture and precise tracking.

Symptom of Misalignment:

If the envelope output is poor, noise will appear in the picture. The tracking will then lose precision and the playback picture will be distorted by any slight variation of the Tracking Control Circuit.

1. Connect the oscilloscope to TP301 (C-PB) on the Main CBA. Use TP302 (RF-SW) as a trigger.
2. Play back the Gray Scale on the Alignment Tape (FL8NW). Set the Tracking Control Circuit to the center position by pressing both CH UP and DOWN buttons on VCR simultaneously. Adjust the height of Guide Rollers [2] and [3] (Fig. M3, Page 2-3-3) watching the oscilloscope display so that the envelope becomes as flat as possibile. To do this adjustment, turn the top of the Guide Roller with the Guide Roller Adj. Screwdriver.
3. If the envelope is as shown in Fig. M7, adjust the height of Guide Roller [2] (Refer to Fig. M3) so that the waveform looks like the one shown in Fig. M9.
4. If the envelope is as shown in Fig. M8, adjust the height of Guide Roller [3] (Refer to Fig. M3) so that the waveform looks like the one shown in Fig. M9.
5. When Guide Rollers [2] and [3] (Refer to Fig.M3) are aligned properly, there is no envelope drop either at the beginning or end of track as shown in Fig. M9.

Note: Upon completion of the adjustment of Guide Rollers [2] and [3] (Refer to Fig. M3), check the X Value by pushing the Tracking Control Up or Down buttons alternately, to check the symmetry of the envelope. Check the number of pushes to ensure center position. The number of pushes UP to achieve 1/2 level of envelope should match the number of pushes DOWN from center. If required, redo the "X Value Alignment."

1-D. Azimuth Alignment of Audio/Control/ Erase Head

Purpose:

To correct the Azimuth alignment so that the Audio/Control/Erase Head meets tape tracks properly.

Symptom of Misalignment:

If the position of the Audio/Control/Erase Head is not properly aligned, the Audio S/N Ratio or Frequency Response will be poor.

1. Connect the oscilloscope to the audio output jack on the rear side of the deck.
2. Play back the alignment tape (FL8NW) and confirm that the audio signal output level is 8 kHz.
3. Adjust Azimuth Adj. Screw so that the output level on the AC Voltmeter or the waveform on the oscilloscope is at maximum. (Fig. M6)

Dropping envelope level at the beginning of track.

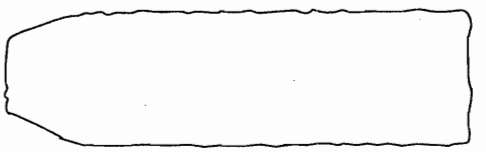


Fig. M7

Dropping envelope level at the end of track.

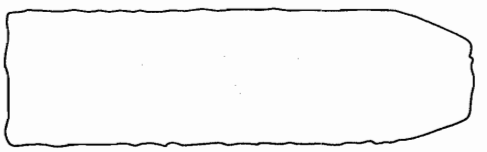


Fig. M8

Envelope is adjusted properly. (No envelope drop)

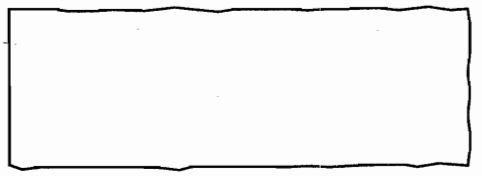


Fig. M9

DISASSEMBLY/ASSEMBLY PROCEDURES OF DECK MECHANISM

Main Mechanism

Before following the procedures described below, be sure to:

1. Remove the deck assembly from the cabinet.
   (Refer to CABINET DISASSEMBLY INSTRUCTIONS on page 1-6-1.)
2. Remove Front Loading Assembly from the main mechanism of the deck assembly. (See Fig. DM1.)
3. First remove Step/Loc. No. [40], and start to remove other parts. (See Fig. DM1.)
4. Before Step/Loc. No. [2] and [9] first remove ACH-9A, ACH-9B, VH Connector 4A, and VH Connector 4B. (See Fig. DM2.)

All the following procedures, including those for adjustment and replacement of parts, should be done in Eject mode; see the positions of [38] and [39] in Fig. DM3 on page 2-4-4. When reassembling, follow the steps in reverse order.

STEP /LOC. No.	START-ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[1]	[1]	Shield Plate	T	DM1	2(S-2)	
[2]	[2]	Loading Motor Assembly	T	DM2 DM3 DM5 DM6	2(S-3), Loading Belt	
[3]	[2]	Motor Holder	T	DM3 DM5	2(S-4)	
[4]	[2]	Cassette Drive Lever Assembly	T	DM3 DM5		(+) Refer to Alignment Sec. Pg. 2-4-10
[5]	[2]	Pinch Roller Assembly	T	DM3 DM5	(C-1)	Refer to Alignment Sec. Pg. 2-4-10
[6]	[6]	Mode SW CBA	B	DM4 DM5	(S-5), Desolder	
[7]	[2]	Cam	T	DM3 DM5		(+) Refer to Alignment Sec. Pg. 2-4-10
[8]	[2]	Pulley Assembly	T	DM3 DM6	(W-1), Loading Belt	(+)
[9]	[9]	Cylinder Assembly	T	DM2 DM3 DM7	4(S-6), *VH Connectors 4A and 4B, Deck Grounding Plate	
[10]	[10]	FE Head	T	DM3 DM7	(S-7)	
[11]	[11]	ACE Head	T	DM2 DM3 DM8	2(S-8)	
[12]	[12]	Tape Guide Assembly	T	DM3 DM8	*(P-1), *(L-1)	
[13]	[12]	Capstan Motor	B	DM4 DM9 DM16	3(S-9), Capstan Belt, *Mode SW	
[14]	[14]	Tension Lever Assembly	T	DM3 DM10	*(L-2), *(L-3), *(P-2)	
[15]	[14]	M Brake S Assembly	T	DM3 DM10	*(L-4)	
[16]	[16]	Rec Arm	B	DM4 DM11	*(L-5)	
[17]	[17]	BT Arm	B	DM4 DM10 DM11	*(L-6), *(P-2)	
[18]	[17]	Holder Kick Arm	B	DM4 DM11	*(P-3)	
[19]	[17]	Tension Plate	B	DM4 DM11		
[20]	[17]	Mode Lever	T	DM3 DM12	*4(L-7), *(L-8), *Fixed Pin	

STEP /LOC. No.	START-ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[21]	[21]	Idler Assembly	T	DM3 DM13	*(L-9)	
[22]	[14]	S Brake Lever Assembly	T	DM3 DM13	*(P-4)	
[23]	[17]	M Brake T Assembly	T	DM3 DM13	*(P-5)	
[24]	[14]	Reel Base Assembly S	T	DM3 DM14	Poly Slider Washer	(+) Base has slots.
[25]	[17]	Reel Base Assembly T	T	DM3 DM14	Poly Slider Washer	(+)
[26]	[26]	M Gear	T	DM3 DM14	*2(L-10), (W-2)	
[27]	[2]	M Lever Holder	T	DM3 DM15		
[28]	[2]	Main Lever Assembly	T	DM3 DM15		
[29]	[29]	Clutch Assembly	B	DM4 DM16	(C-2), (W-3), Capstan Belt	(+)
[30]	[29]	FF Arm	B	DM4 DM16	*2(L-11)	
[31]	[31]	Sensor Gear	B	DM4 DM17	(C-3)	
[32]	[32]	Prism T	B	DM4 DM17	(S-10)	
[33]	[33]	Prism	B	DM4 DM17	(S-11)	
[34]	[12]	Loading Lever Assembly	B	DM4 DM18	(S-12)	(+) Refer to Alignment Sec. Pg. 2-4-10
[35]	[34]	Loading Arm T Assembly	B	DM4 DM18		(+) Refer to Alignment Sec. Pg. 2-4-10
[36]	[34]	Loading Arm S Assembly	B	DM4 DM18	*(L-12)	(+) Refer to Alignment Sec. Pg. 2-4-10
[37]	[37]	Spring Plate Assembly	B	DM4 DM19	(S-13)	Refer to Alignment Sec. Pg. 2-4-10
[38]	[2]	Moving Guide S Preparation	T	DM3 DM20	Slide to rear to remove	
[39]	[2]	Moving Guide T Preparation	T	DM3 DM20	Slide to rear to remove	
[40]	[40]	Deck Grounding Plate	T	DM1 DM3	(S-14)	
[41]	[41]	Cleaning Head	T	DM3 DM7	*(L-13)	
[42]	[42]	F Brake Guide	B	DM4 DM9	(S-15), (S-16), *(P-6)	
[43]	[43]	Radiator Plate	T	DM3 DM8	(S-17)	
↓ ①	↓ ②	↓ ③	↓ ④	↓ ⑤	↓ ⑥	↓ ⑦

①: Follow steps in sequence. When reassembling, follow the steps in reverse order.
These numbers are also used as Identification (location) No. of parts in the figures.

②: Indicates the part to start disassembling with in order to disassemble the part in column (1).

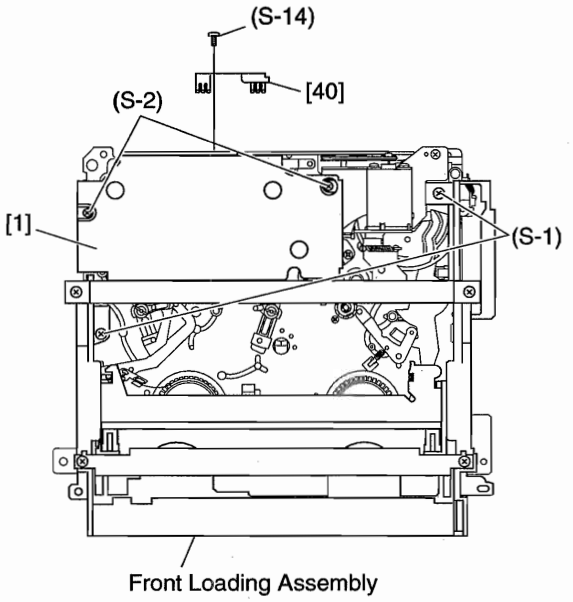
③: Name of the part

④: Location of the part: T=Top B=Bottom R=Right L=Left

⑤: Figure Number

⑥: Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.
P=Spring, W=Washer, C=Cut Washer, S=Screw, *=Unhook, Unlock, Release, Unplug, or Desolder
e.g., 2(L-2) = two Locking Tabs (L-2).

⑦: Adjustment Information for Installation
(+): Refer to Deck Exploded Views for lubrication.



To remove Front Loading Assembly:
1. Remove 2 Screws; 2(S-1).
2. Lift Assembly up carefully.

Fig. DM1

Top View

Bottom View

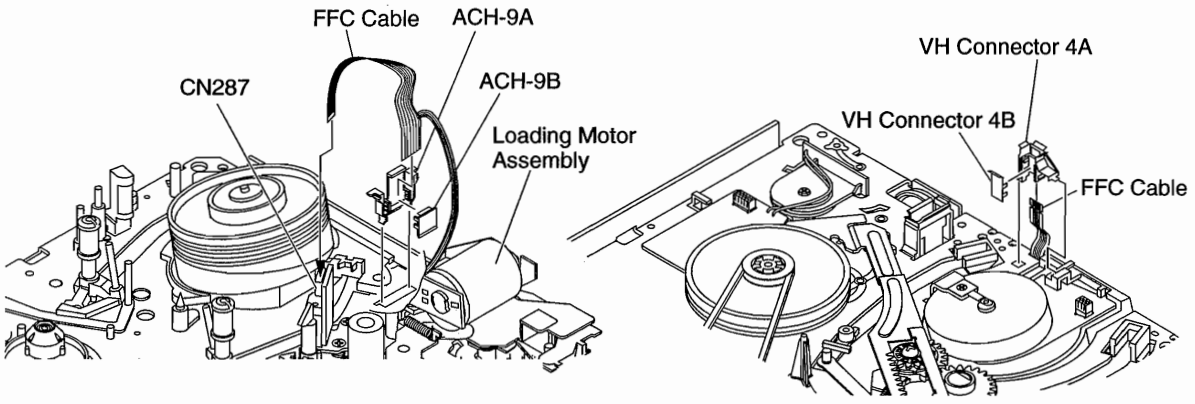


Fig. DM2

Top View

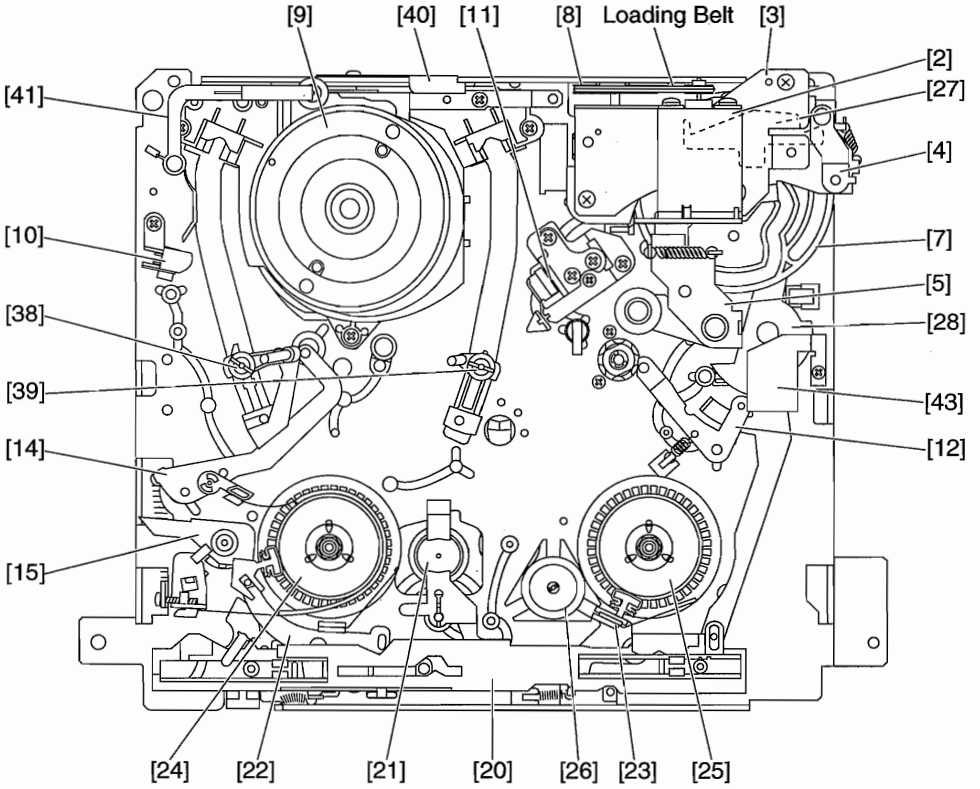


Fig. DM3

Bottom View

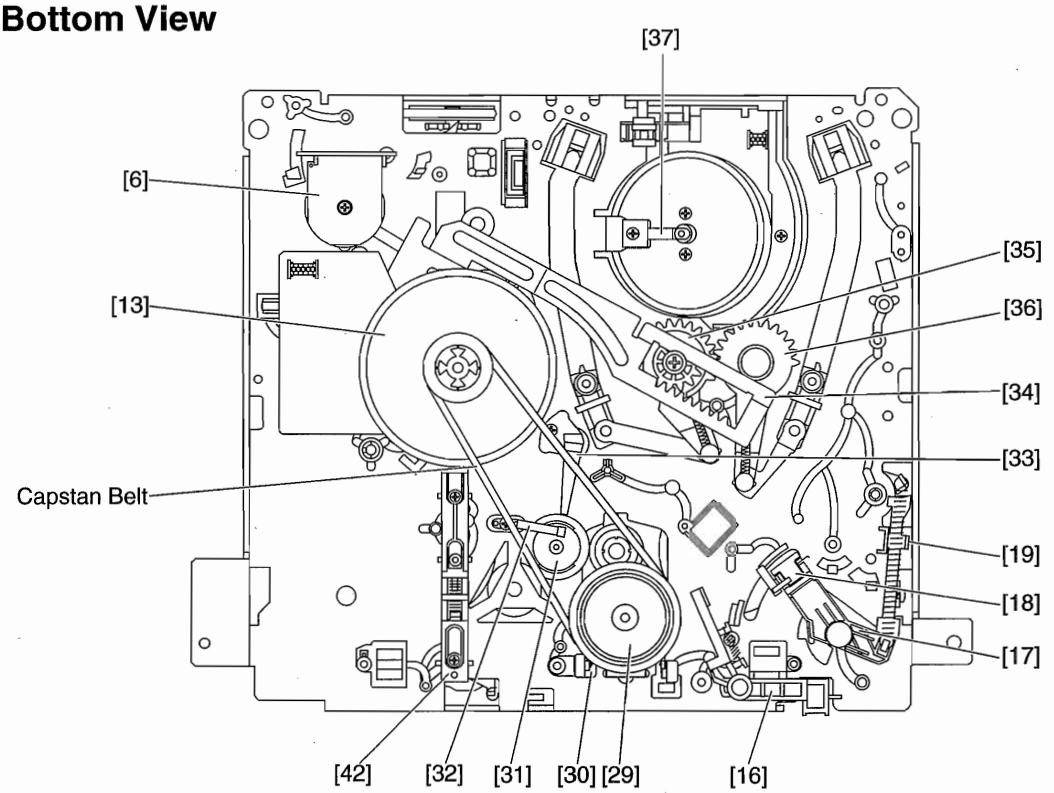
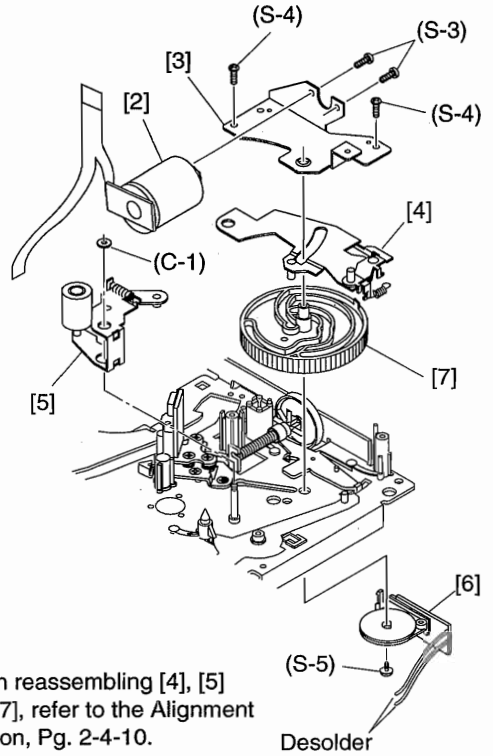
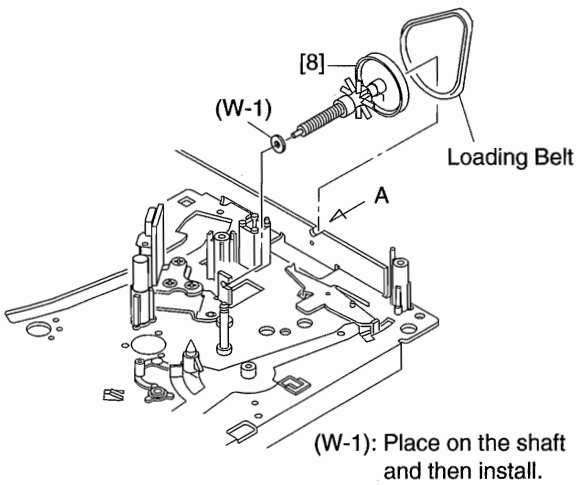


Fig. DM4



When reassembling [4], [5] and [7], refer to the Alignment Section, Pg. 2-4-10.

Fig. DM5



(W-1): Place on the shaft and then install.

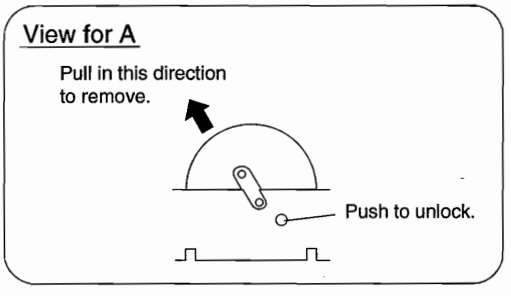


Fig. DM6

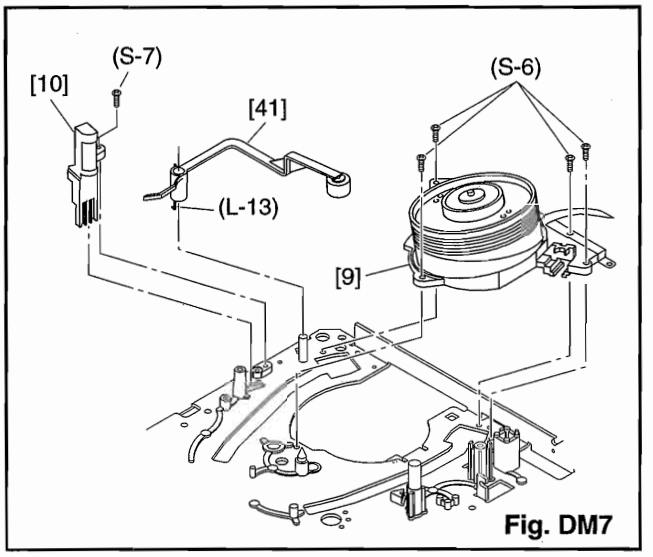


Fig. DM7

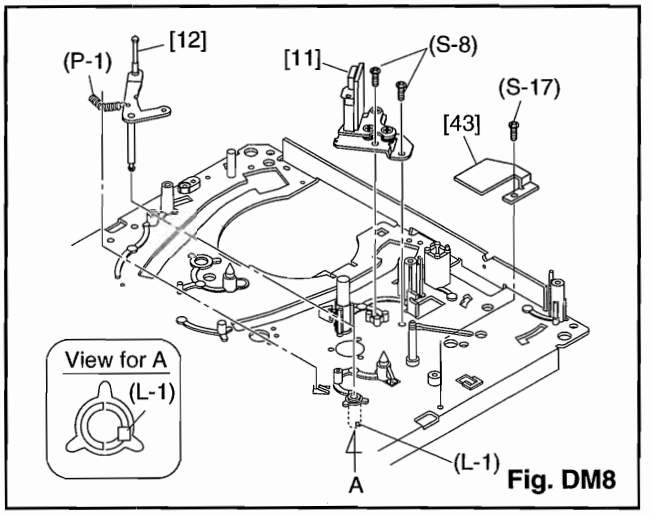


Fig. DM8

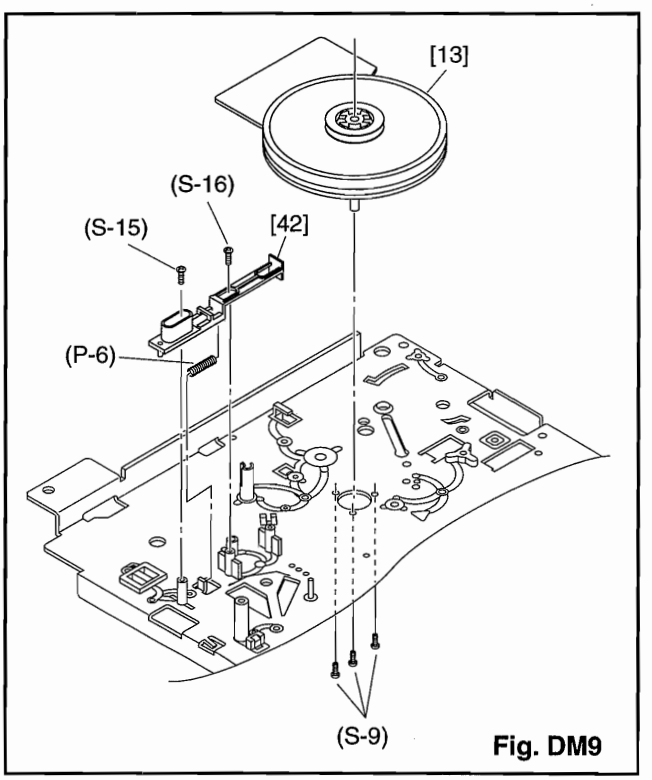


Fig. DM9

When reassembling, refer to the Alignment Section, Pg. 2-4-12.

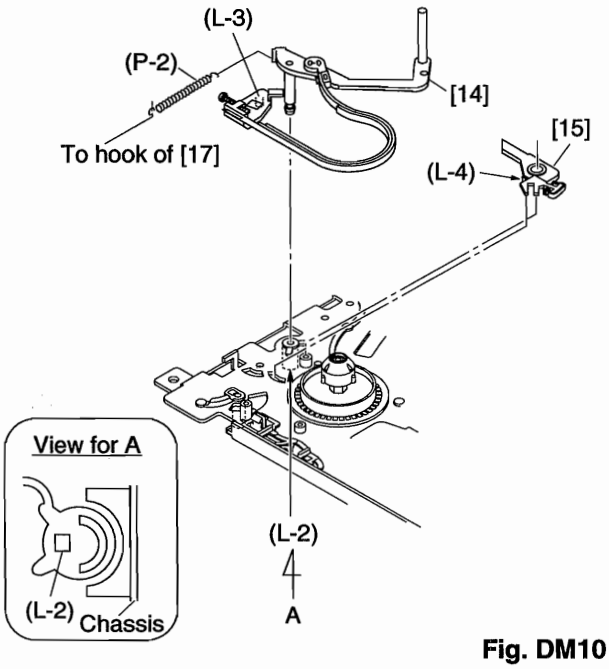
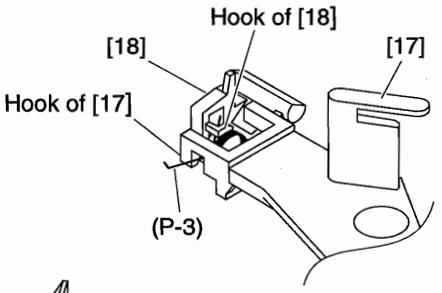


Fig. DM10

View for A

Reassembly [17], [18] and (P-3).



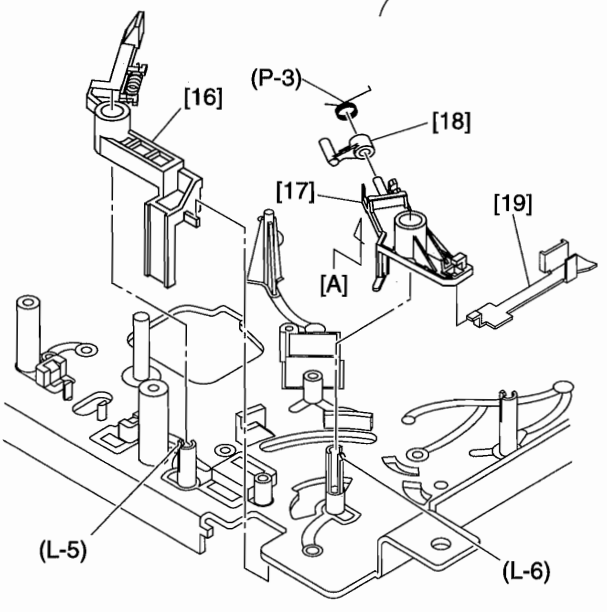
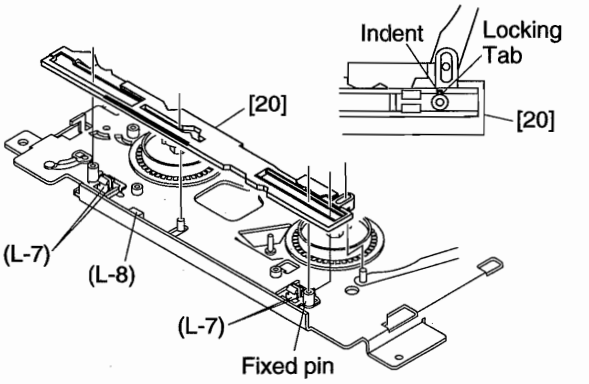


Fig. DM11

Turn [8] counterclockwise to move [20] to the right.
Align the indent of [20] with Locking Tab.



Position of Mode Lever when installed

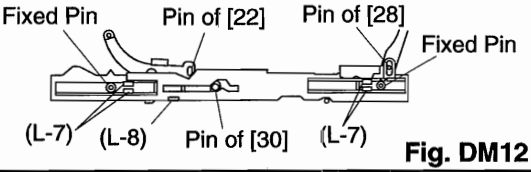


Fig. DM12

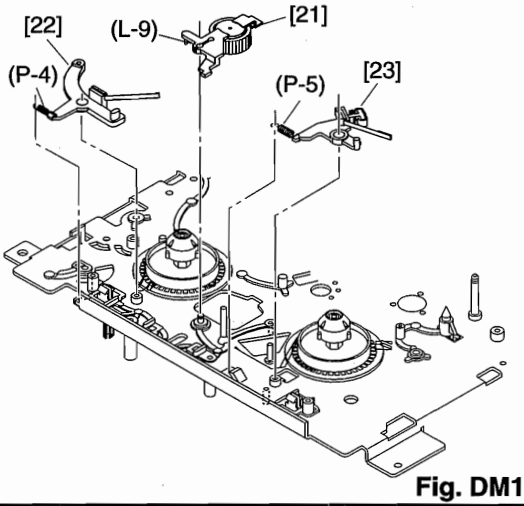


Fig. DM13

If the alignment height is not correct, it is acceptable to use one more Poly Slider Washer to raise the height. (Poly Slider Washer is 0.1 mm/0.004 inch in thickness.)

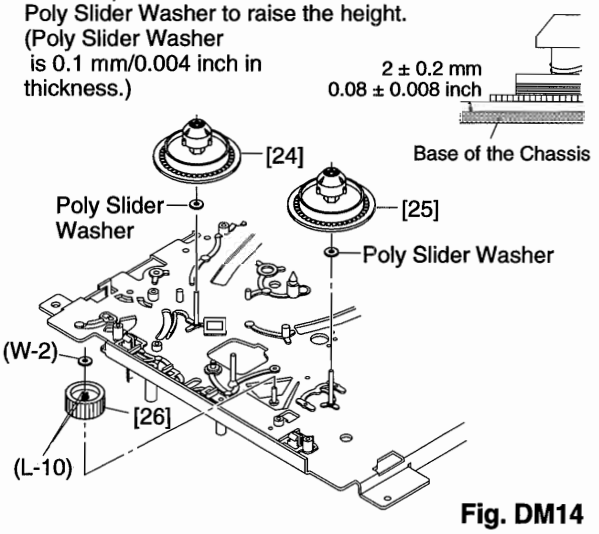


Fig. DM14

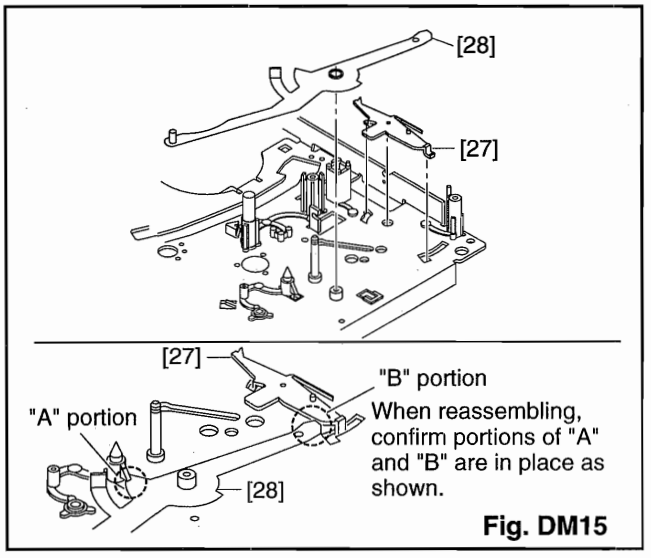


Fig. DM15

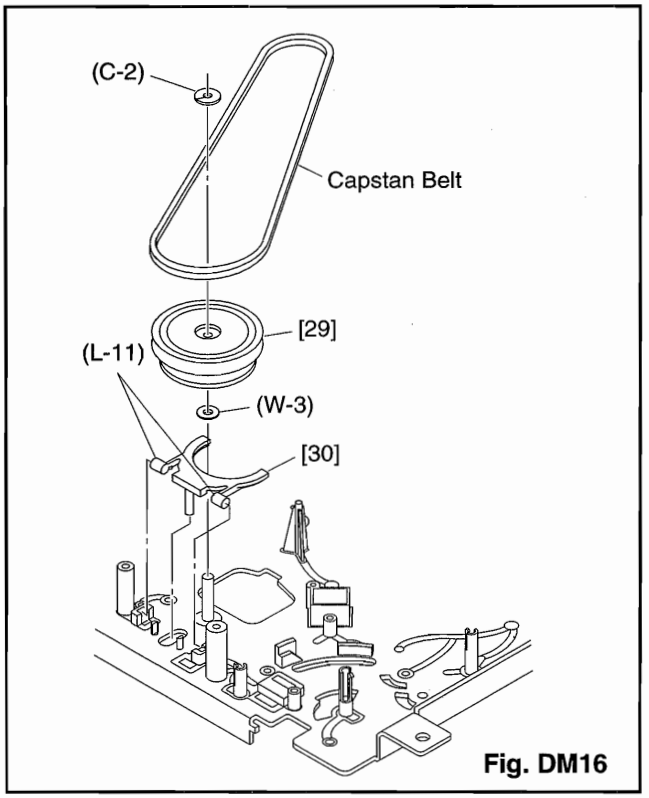


Fig. DM16

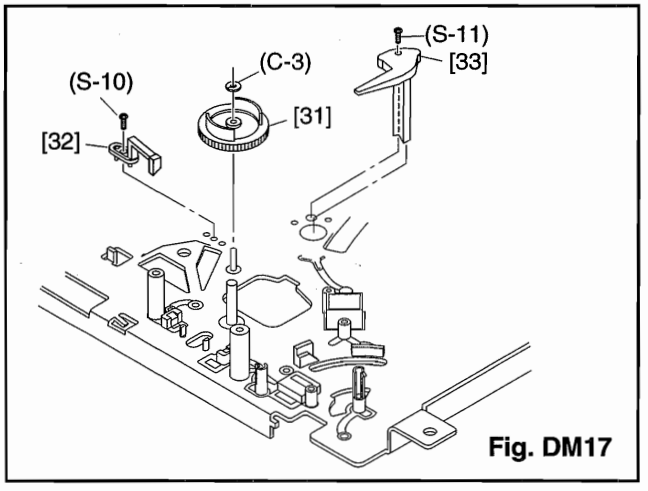


Fig. DM17

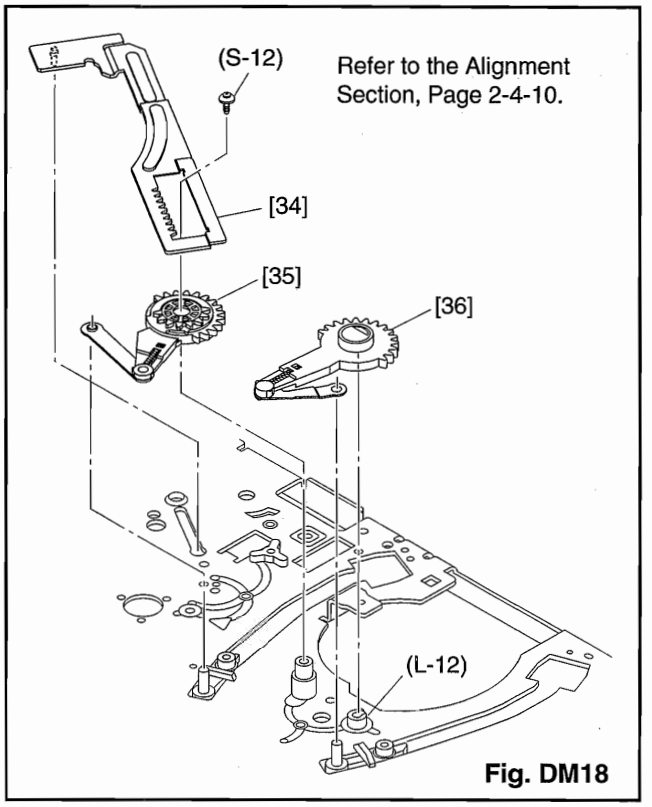


Fig. DM18

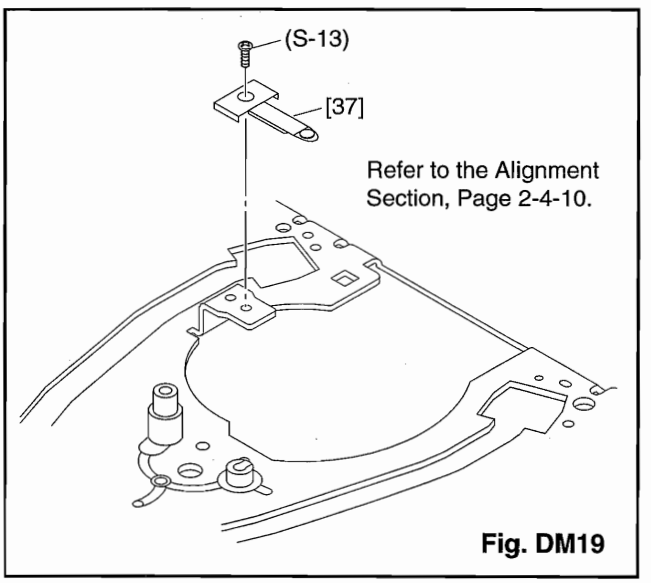


Fig. DM19

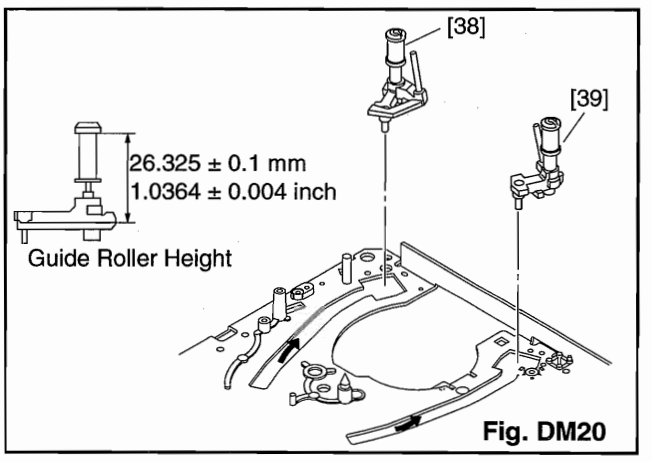


Fig. DM20

Front Loading Assembly

Before following the procedures described below, be sure to remove Front Loading Assembly from the main mechanism of the deck assembly. (See Fig. DM1.) When reassembling, start with the unit in Cassette-in mode and follow the steps in reverse order.

STEP /LOC. No.	START-ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
*[1]	[1]	Slider Gear	R (or L)	DM23 DM24	*2(L-1)	(+)
*[2]	[1]	Slider Gear	L (or R)	DM23 DM24	*2(L-2)	(+)
		Slider Shaft	T			Install in Eject position.
[3]	[1]	[3a] Front Guide [3b] Cassette Holder Assembly [3c] Guide Holder B [3d] Guide Holder F	T	DM21 DM22 DM23	*2(L-3), 4(S-1), 2(S-2), Eject Spring B	
		[3e] Cassette Guide R	R			(+)
		[3f] Cassette Guide L	L			(+)
[4]	[4]	Front Door Opener	R	DM21 DM22 DM23	*(L-4)	
[5]	[4]	Rack	R	DM21 DM22 DM23	*(L-5)	
[6]	[5]	Cassette Drive Gear	R	DM21 DM22 DM23	*(L-6), Cassette Drive Gear Spring	(+)
[7]	[7]	[7a] Mirror R [7b] Mirror L	R L	DM23		
[8]	[8]	LDG Plate	R	DM23	2(S-3)	
↓ ①	↓ ②	↓ ③	↓ ④	↓ ⑤	↓ ⑥	↓ ⑦

①: Follow steps in sequence. When reassembling, follow the steps in reverse order.
These numbers are also used as Identification (location) No. of parts in the figures.

②: Indicates the part to start disassembling with in order to disassemble the part in column (1).

③: Name of the part

④: Location of the part: T=Top B=Bottom R=Right L=Left

⑤: Figure Number

⑥: Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.
P=Spring, W=Washer, C=Cut Washer, S=Screw, *=Unhook, Unlock, Release, Unplug, or Desolder
e.g., 2(L-2) = two Locking Tabs (L-2).

⑦: Adjustment Information for Installation
(+): Refer to Deck Exploded Views for lubrication.

*[1], *[2]: Slider Gear in Step [1] and that in Step [2] are identical. However, they are divided into two steps because, before reassembling Slider Shaft, one Slider Gear must be preinstalled at either end of Slider Shaft.

Before removing Parts [3], [4], [5], or [6], shift [3b] to Cassette-in position.

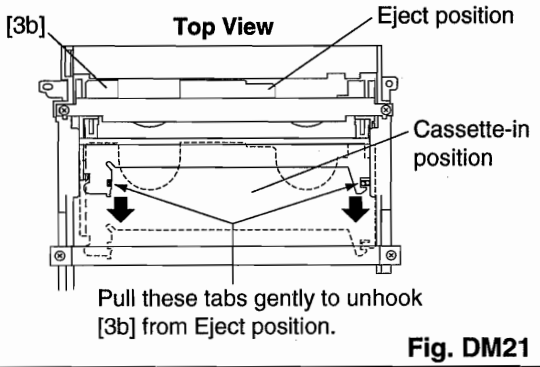


Fig. DM21

Install/remove in Cassette-in position to ensure that [3b] is in locked position.

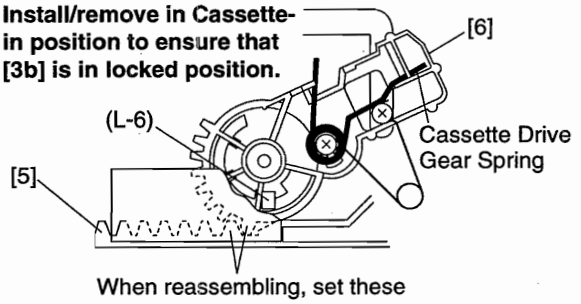
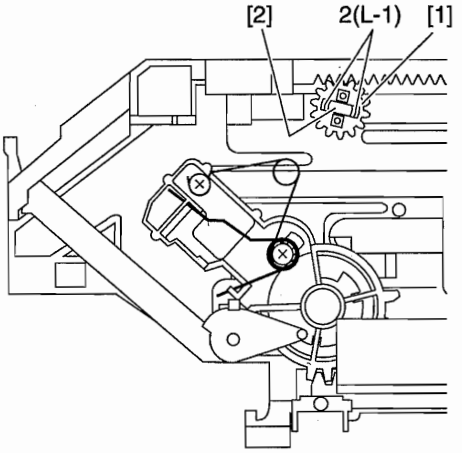


Fig. DM22

View before disassembling [1] and [2] (Installation of Slider Shaft and Slider Gear)



Install [1] and [2] in Eject position.
(When disassembling, [1] and [2] can be removed either in Eject position or Cassette-in position.)

- This figure shows where [1], [2] and other parts are in Eject position.

Fig. DM24

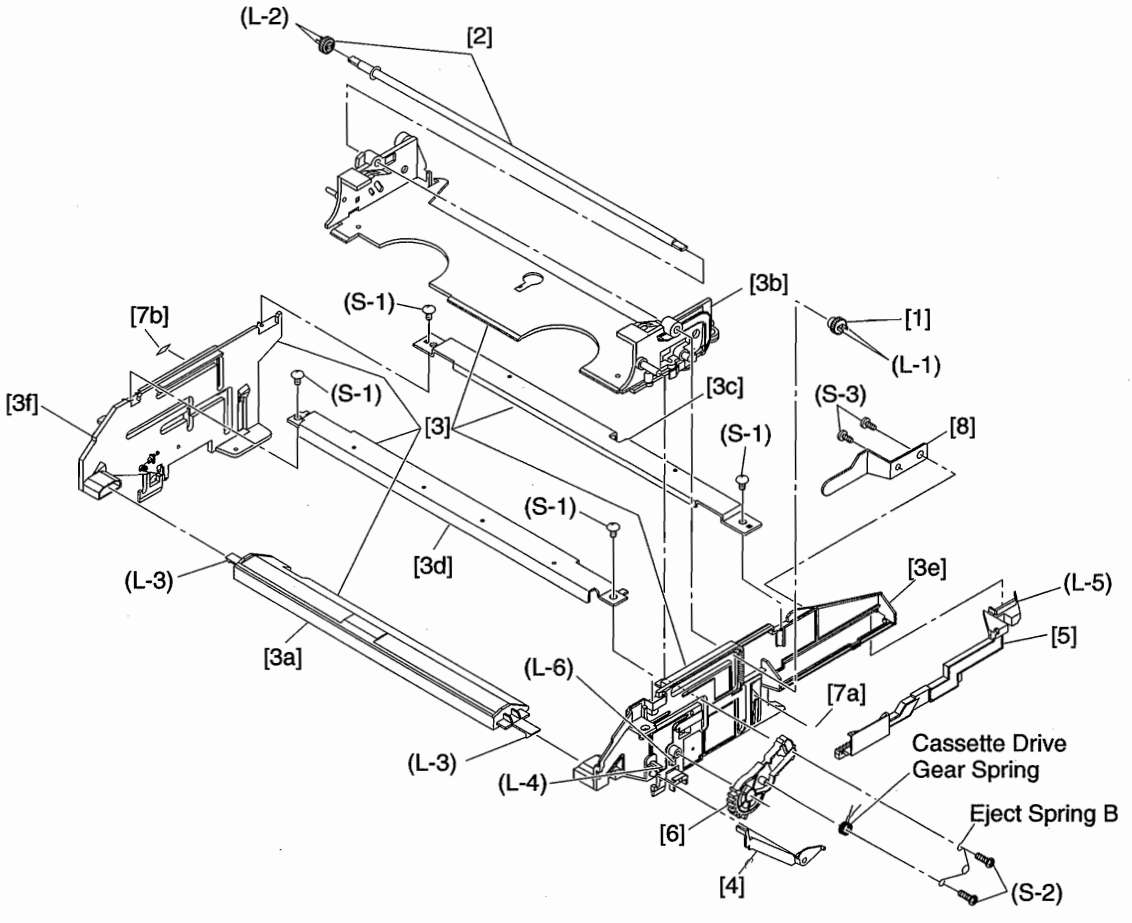


Fig. DM23

ALIGNMENT PROCEDURES OF MECHANISM

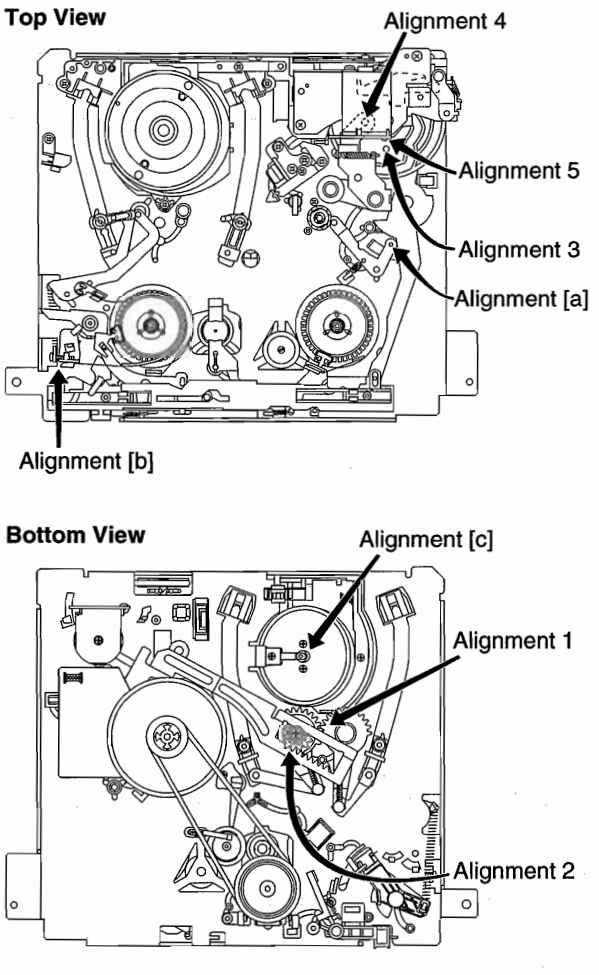
The following procedures describe how to align the individual gears and levers that make up the tape loading/unloading mechanism. Since information about the state of the mechanism is provided to the System Control Circuit only through the Mode Switch, it is essential that the correct relationship between individual gears and levers be maintained.

All alignments are to be performed with the mechanism in Eject mode, in the sequence given. Each procedure assumes that all previous procedures have been completed.

IMPORTANT:

If any one of these alignments is not performed properly, even if off by only one tooth, the unit will unload or stop and it may result in damage to the mechanical or electrical parts.

Alignment points in Eject Position



Alignment [a] through [c] can be done independently of any other alignment.

Fig. AL1

Alignment 1

Loading Arm, S and T Assembly

1. Install Loading Arm S and T Assembly so that their triangle marks point to each other as shown in Fig. AL2.

Alignment 2

Loading Lever Assembly

1. Keeping the two triangles pointing at each other, install the Loading Arm T Assembly so that the last tooth of the gear meets the most inside teeth of the Loading Lever Assembly. See Fig. AL2.

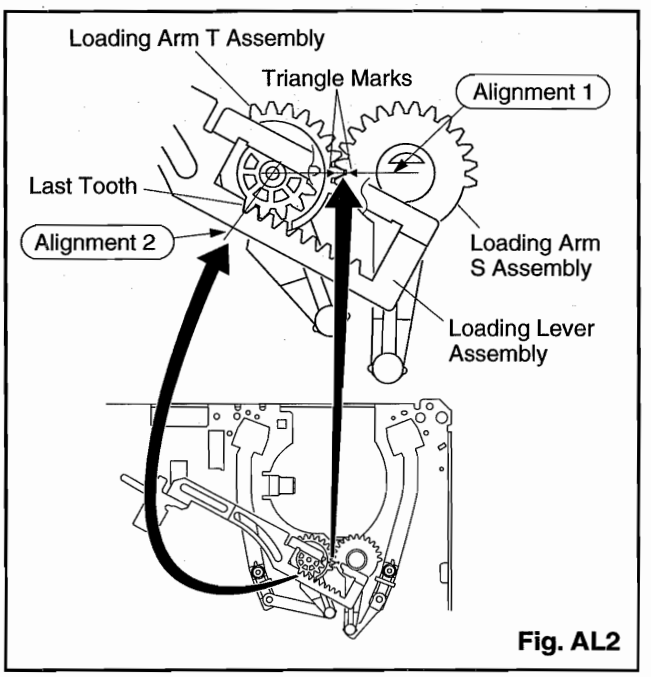


Fig. AL2

Alignment [a]

Tape Guide Assembly

1. Measurement of the black screw must be as specified in Fig. AL3.

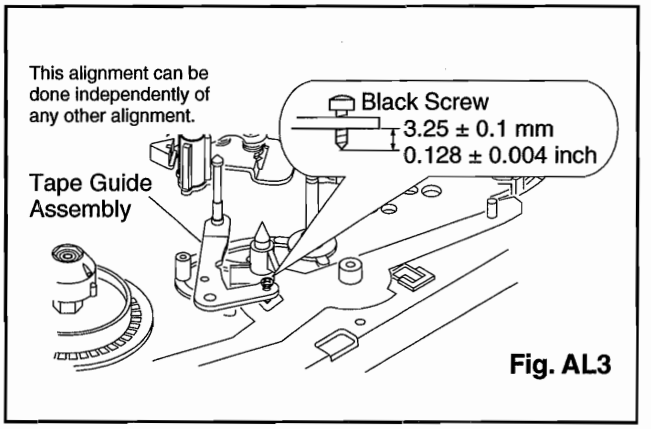

This alignment can be done independently of any other alignment.
Black Screw
3.25 ± 0.1 mm
0.128 ± 0.004 inch
Tape Guide Assembly

Fig. AL3

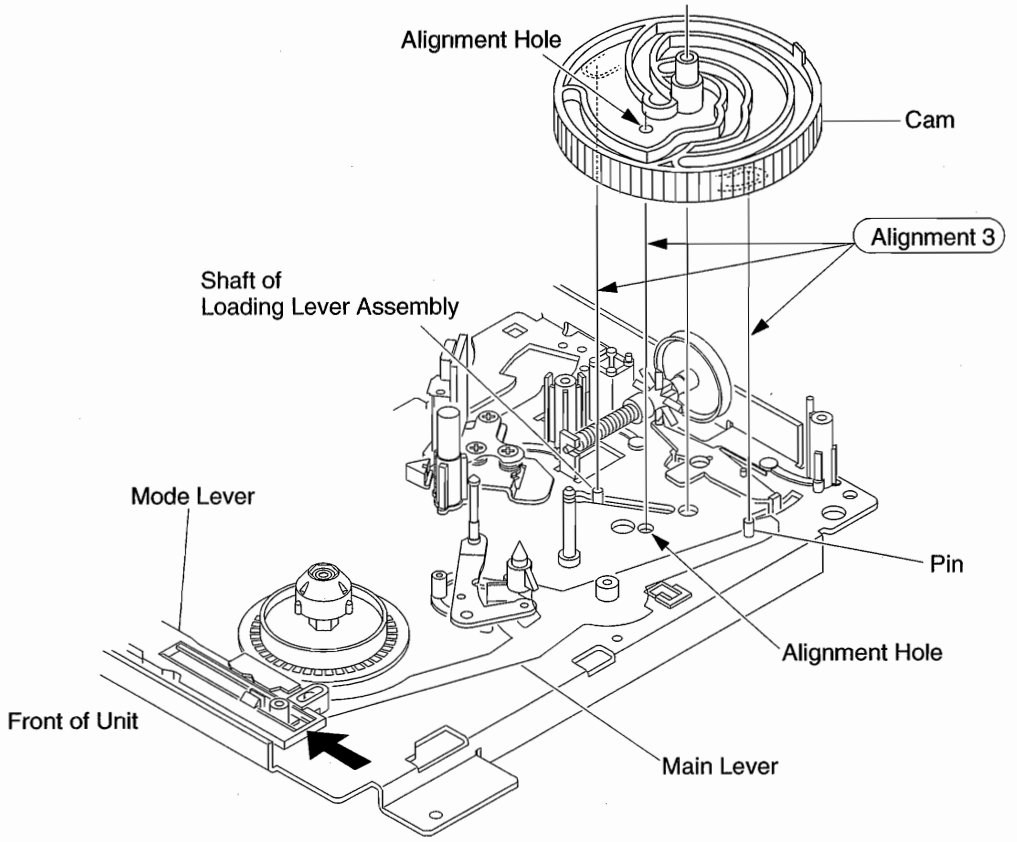


Fig. AL4

Alignment 3

Cam

1. Make sure that the mechanism is in Eject mode so that the shaft of Loading Lever Assembly is in the position shown in Fig. AL4.
2. Align the alignment hole of the Cam with the alignment hole of the base, holding the Cam just above the base.
3. Carefully keeping these two holes aligned, push Mode Lever in the direction of the arrow to install the Cam. The Mode Lever must be pushed to make the pin on the Main Lever fit in the proper groove in the lower Cam.
4. After installing the Cam, make sure that the alignment hole of the Cam is still aligned with the base hole and that the pin on the Main Lever and the shaft of the Loading Lever Assembly are inserted into the proper grooves of the lower Cam as specified in Fig. AL4.

Alignment 4

Pinch Roller Assembly

1. Ensure that the pin of the Pinch Roller Arm Assembly is positioned in the end of the groove of the upper Cam as shown in Fig. AL5.

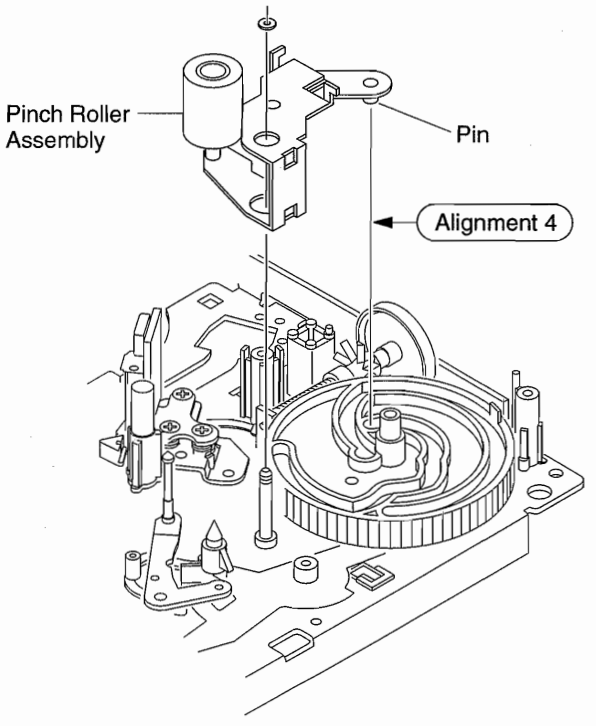


Fig. AL5

Alignment 5

Cassette Drive Lever Assembly

1. Ensure that the pin of the Cassette Drive Lever Assembly is positioned in the groove of the upper Cam and that the hole of that is positioned as shown in Fig. AL6. Then, make sure that the tab of the Cassette Drive Lever Assembly is within the tab of the Cam.

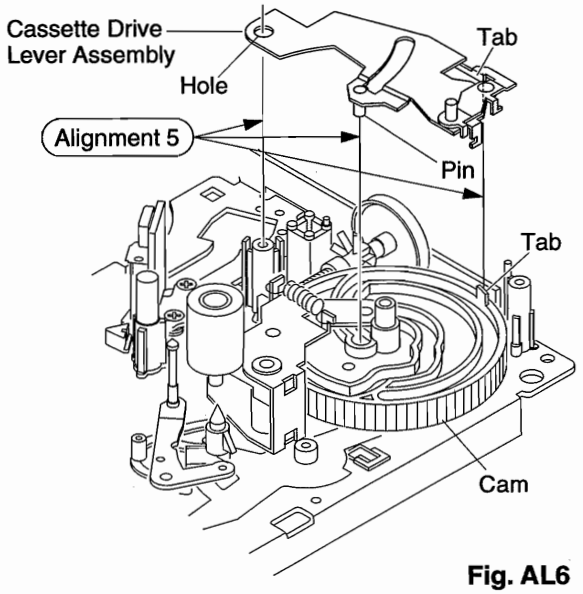


Fig. AL6

Alignment [b]

This alignment can be performed independently of any other alignment.

Band Brake Assembly

1. Ensure that Band Brake Assembly is positioned parallel to the chassis' notch as shown in Fig. AL7. This measurement can be made by eye.

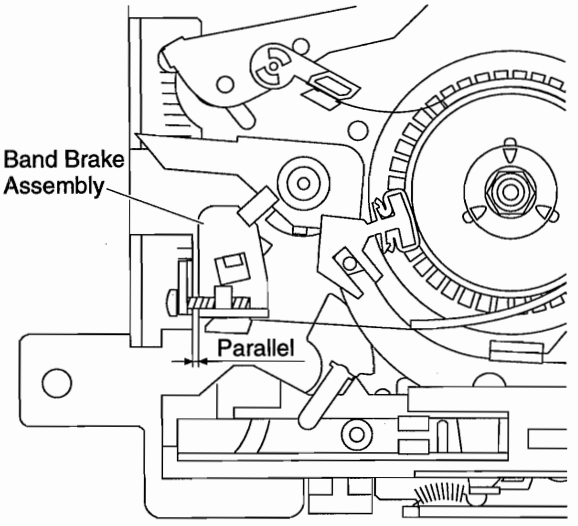


Fig. AL7

Alignment [c]

This alignment can be performed independently of any other alignment.

Spring Plate Assembly

1. Check to see if the Spring Plate Assembly is properly set in a position equal to or just less than 1mm (0.04 inch) (but never more than 1 mm or 0.04 inch), as measured from the center of the brush to the center of the Cylinder Shaft as shown in Fig. AL8.

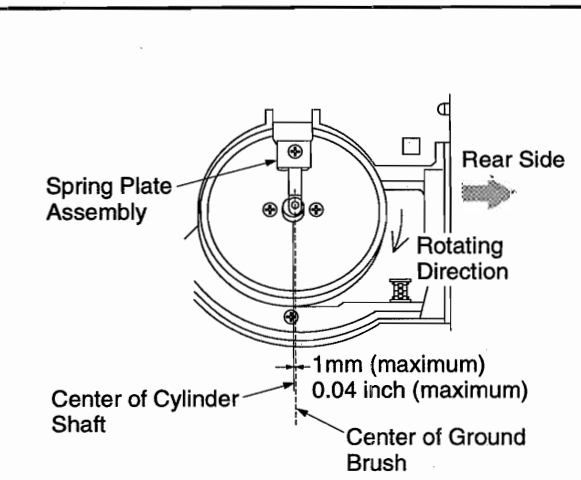


Fig. AL8

2. If this measurement exceeds 1mm (0.04 inch), loosen and refasten the screw of the Spring Plate Assembly. If this is not enough and further adjustment is necessary, loosen and refasten the three screws of Cylinder Assembly. These three screws are shown in Fig. DM7 in DISASSEMBLY/ASSEMBLY PROCEDURES OF DECK MECHANISM (page 2-4-5).

Note: DO NOT install the Spring Plate Assembly in the opposite position (on the left side of the center of the Cylinder shaft), but always within a maximum of 1mm (0.04 inch) to the right side of the center of this shaft.

EXPLODED VIEWS AND PARTS LIST SECTION

4-Head Hi-Fi VIDEO CASSETTE RECORDER

LV446G / LV448HG / SE447SG

Sec. 3: Exploded views and Parts List Section

- **Exploded views**
- **Parts List**

TABLE OF CONTENTS

Exploded Views 3-1-1
Mechanical Parts List 3-2-1
Electrical Parts List 3-3-1
Deck Parts List 3-4-1

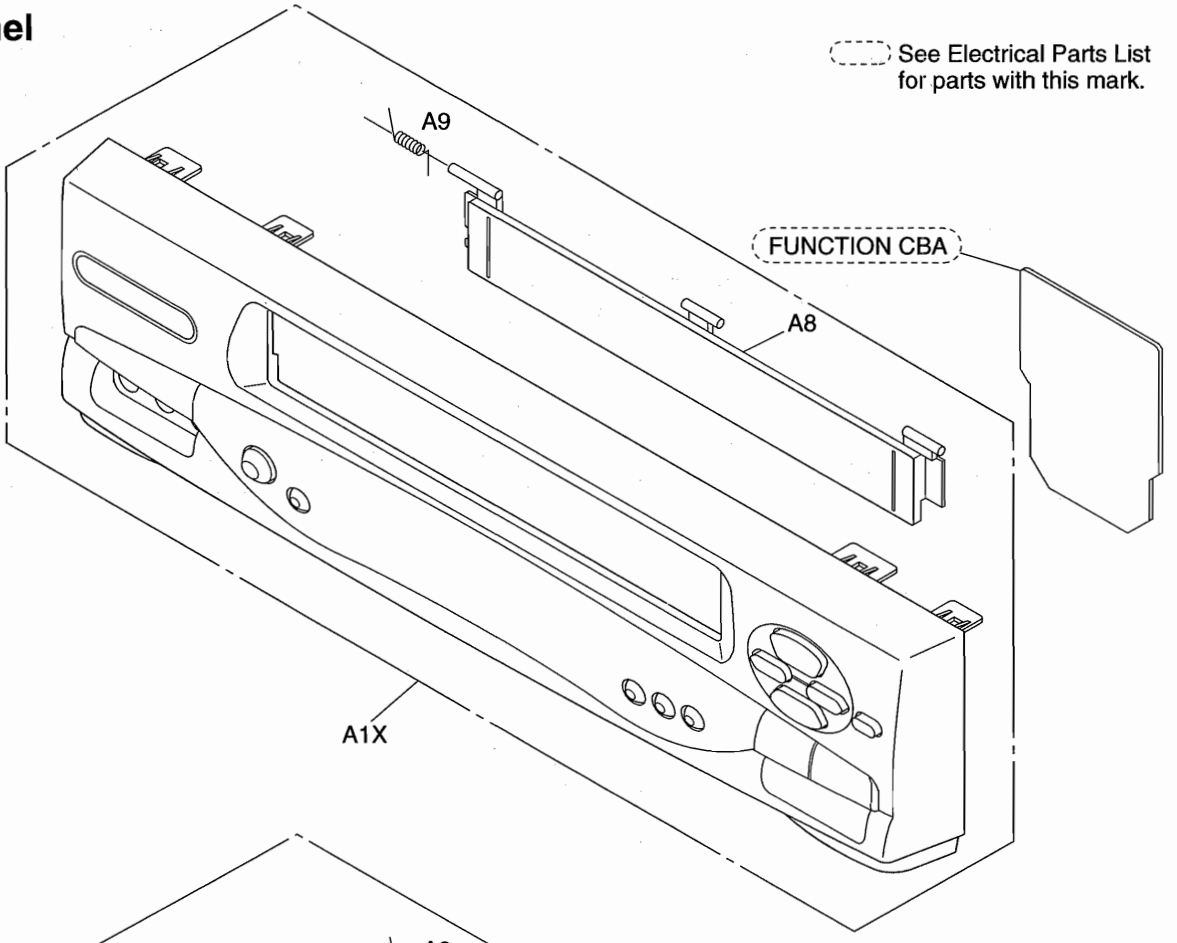
H7409CVR

EXPLODED VIEWS

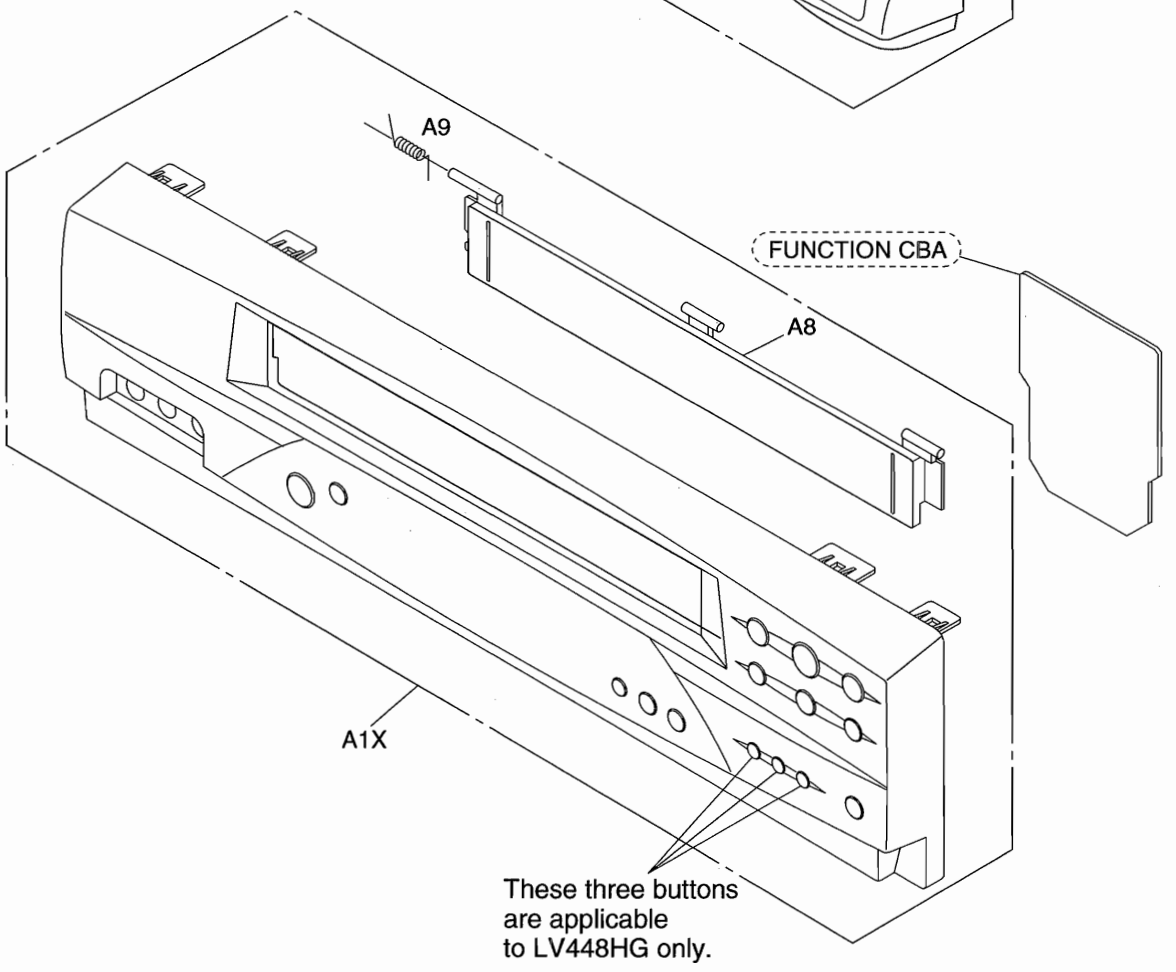
Front Panel

See Electrical Parts List for parts with this mark.

SE447SG



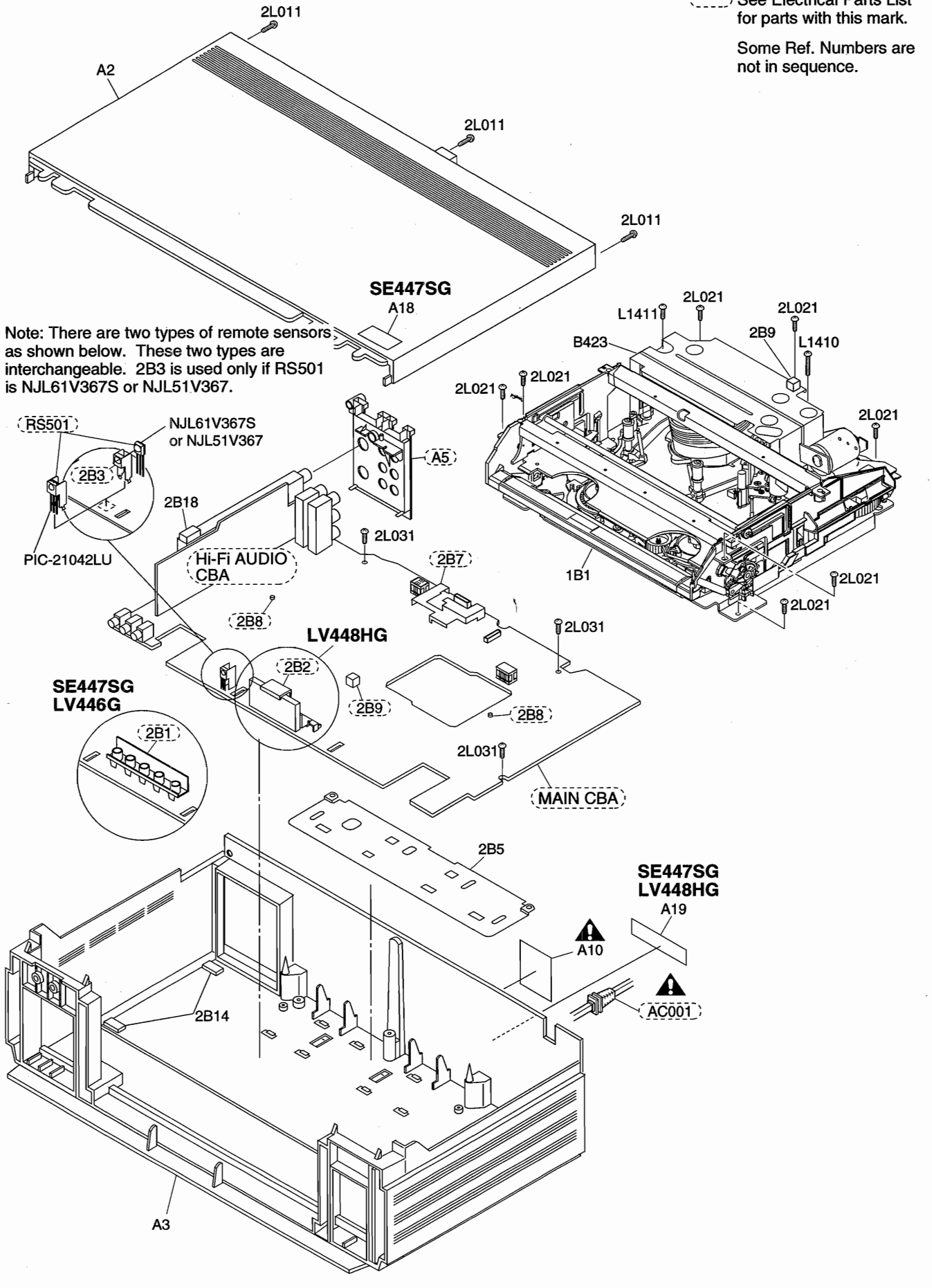
LV448HG
LV446G



Cabinet

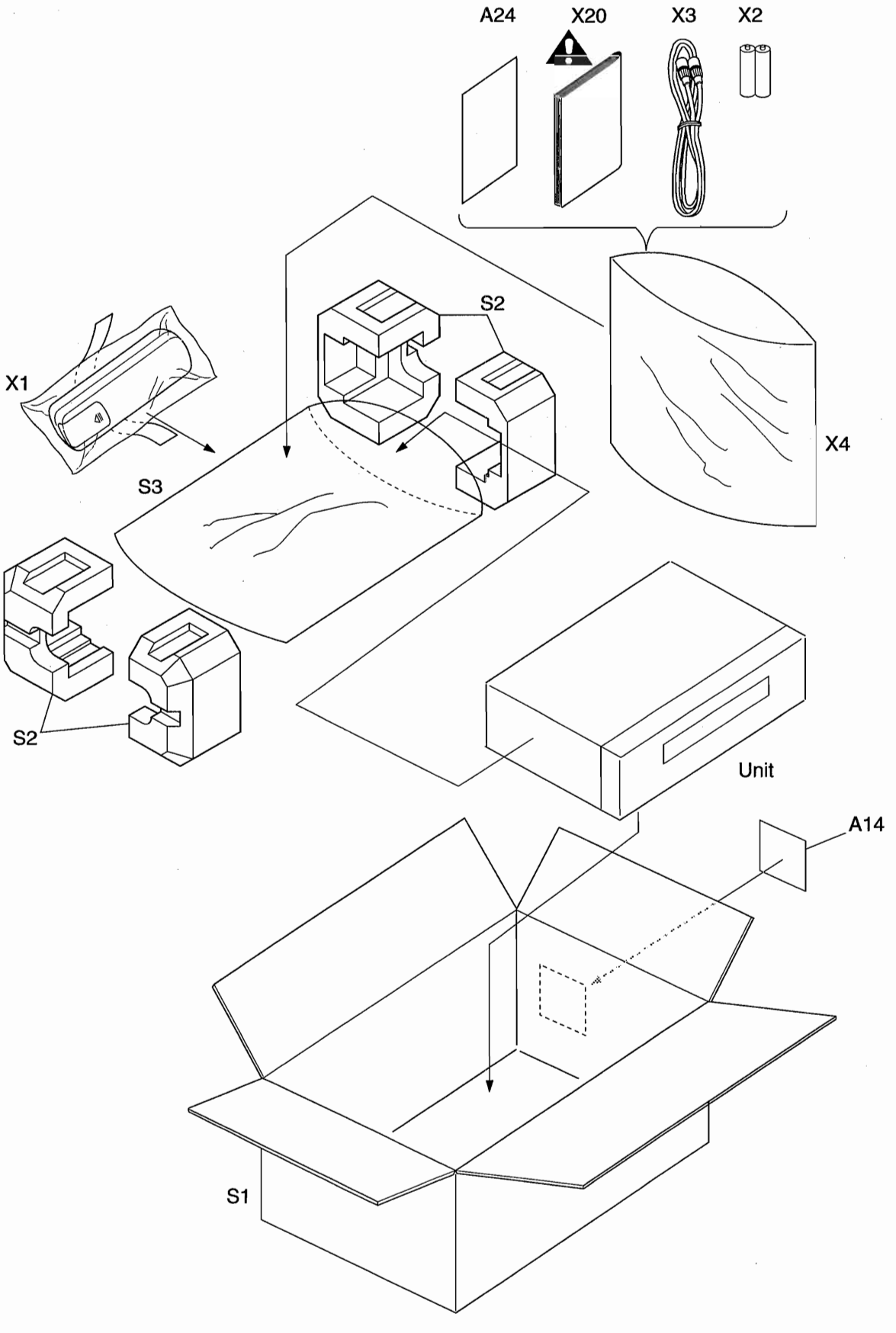
( ) See Electrical Parts List for parts with this mark.

Some Ref. Numbers are not in sequence.



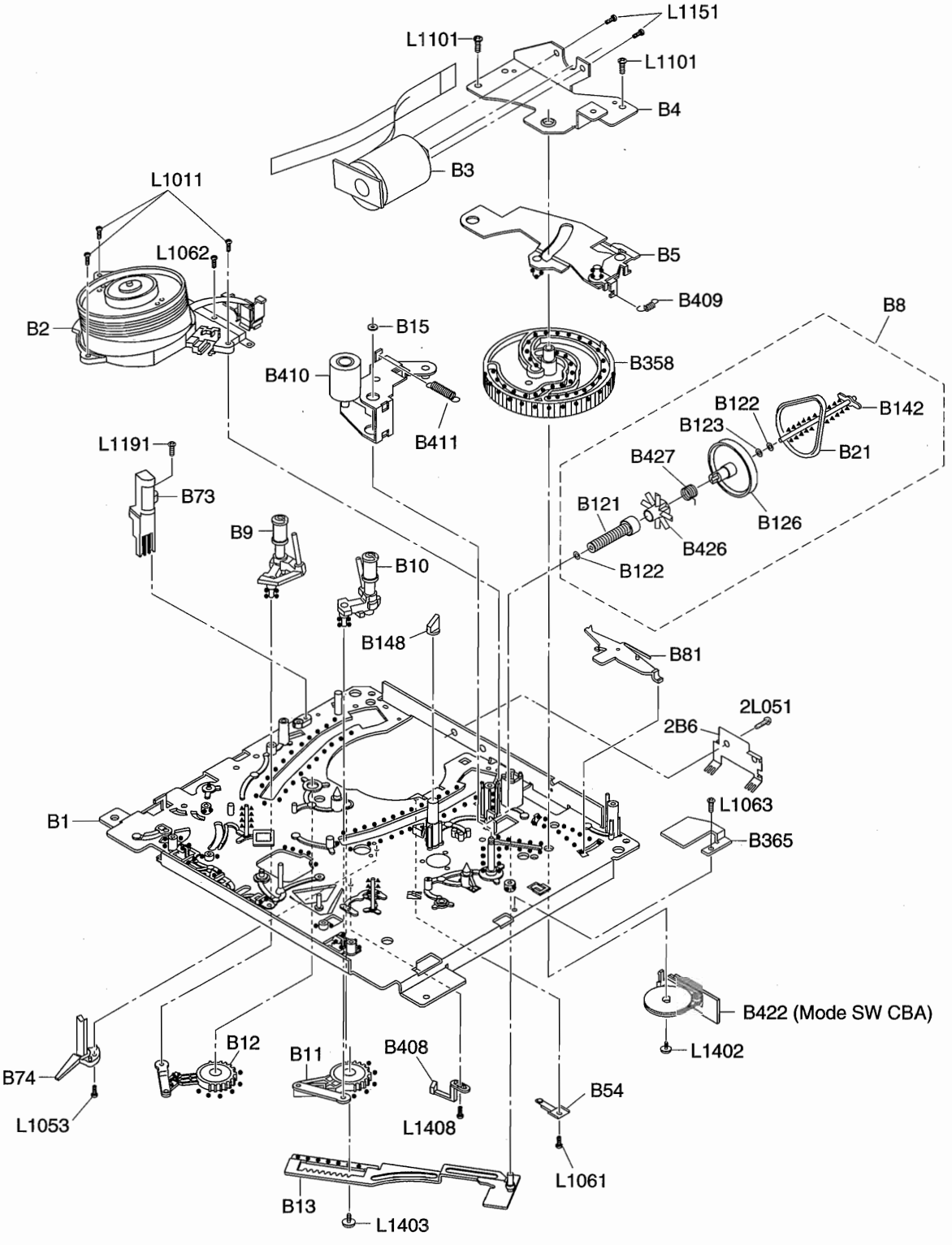
Packing

Some Ref. Numbers are not in sequence.



Deck Mechanism View 1

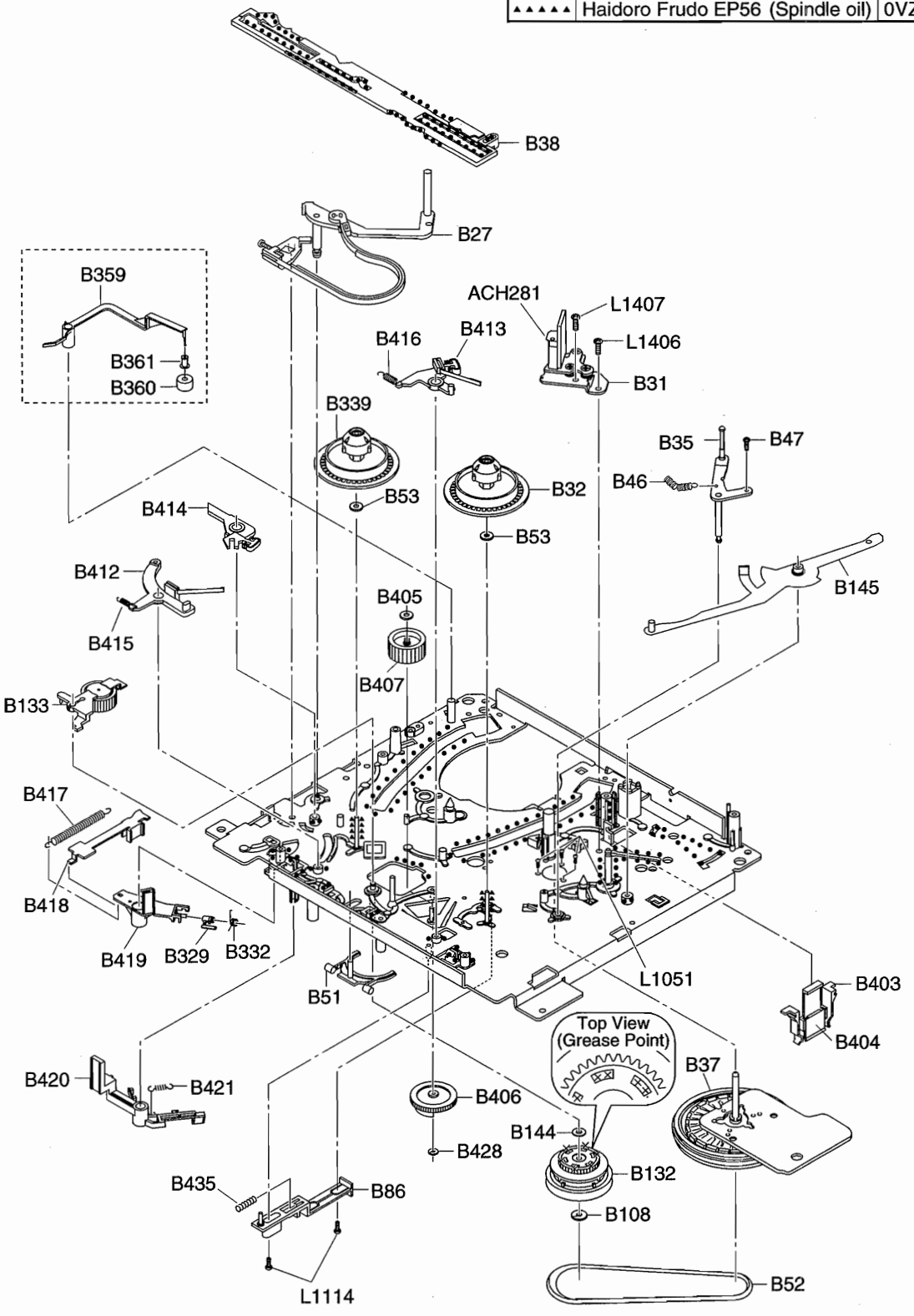
Mark	Description	Part No.
●●●●●	Floil G-374G (Blue grease)	0VZZ00109
▲▲▲▲▲	Haidoro Frudo EP56 (Spindle oil)	0VZZ00068



Some Ref. Numbers are not in sequence.

Deck Mechanism View 2

Mark	Description	Part No.
×××××	Sankohl FG-84M (White grease)	0VZZ00062
•••••	Floil G-374G (Blue grease)	0VZZ00109
▲▲▲▲▲	Haidoro Frudo EP56 (Spindle oil)	0VZZ00068

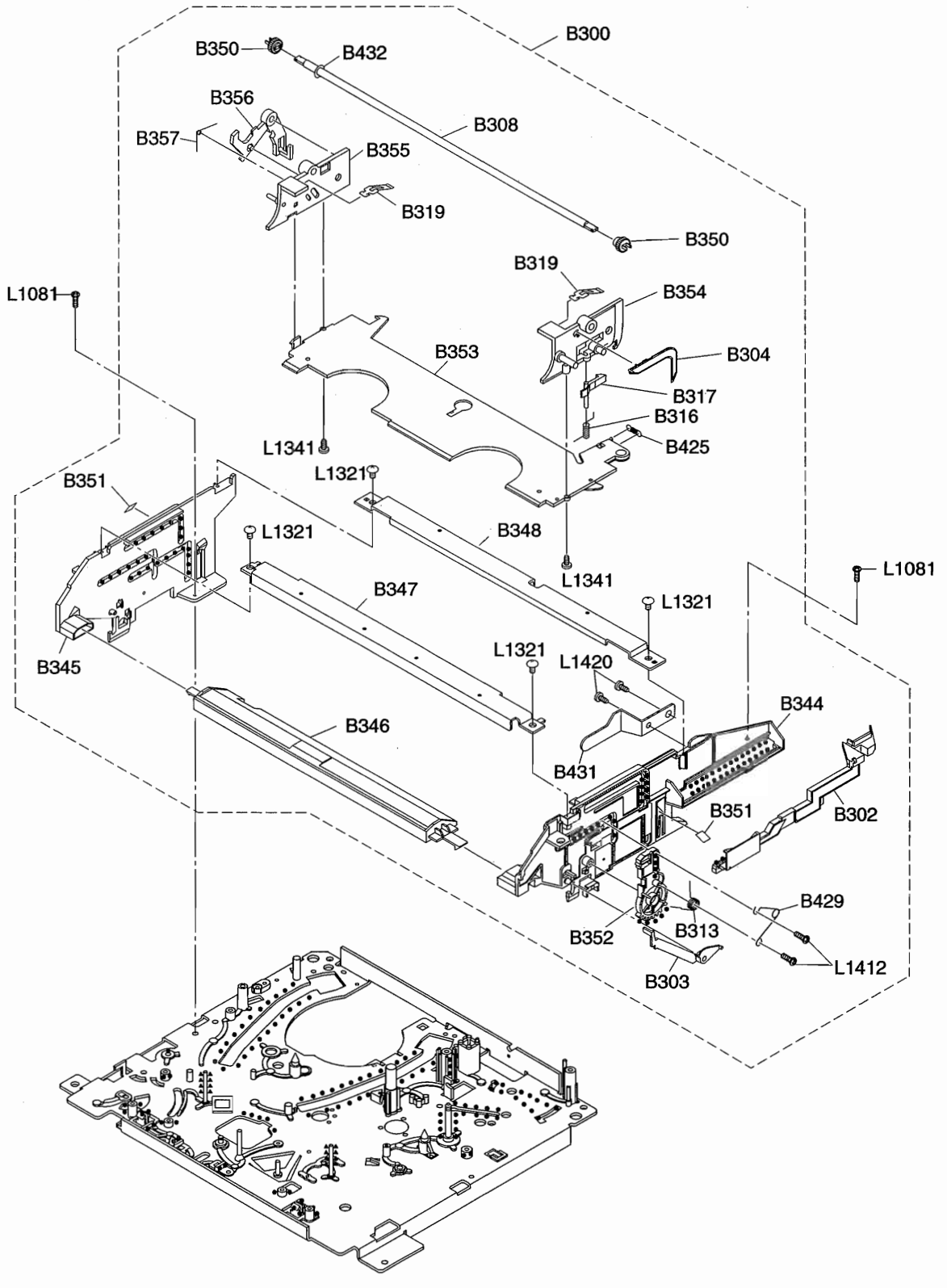


See the Mechanical Parts List.

Some Ref. Numbers are not in sequence.

Deck Mechanism View 3

Mark	Description	Part No.
●●●●●	Floil G-374G (Blue grease)	0VZZ00109
▲▲▲▲▲	Haidoro Frudo EP56 (Spindle oil)	0VZZ00068



Some Ref. Numbers are not in sequence.

MECHANICAL PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

Comparision Chart of Models and Marks

MODEL	MARK
SE447SG	A
LV448HG	B
LV446G	C

Ref. No.	Mark	Description	Part No.
A1X	A	FRONT ASSEMBLY	0VM202189
A1X	B	FRONT ASSEMBLY	0VM202193
A1X	C	FRONT ASSEMBLY	0VM202192
A 2		CASE, TOP(U15)	0VM100643
A 3		CHASSIS(U15)	0VM000093
A 5		JACK BOARD(HI-FI) (See Electrical Parts List)	
A 8	A	DOOR, CASSETTE	0VM408214
A 8	B	DOOR, CASSETTE	0VM408229
A 8	C	DOOR, CASSETTE	0VM408228
A 9		SPRING, DOOR	0VM403265
A 10 ⚠	A	LABEL, RATING	0VM408217
A 10 ⚠	B	LABEL, RATING	0VM408237
A 10 ⚠	C	LABEL, RATING	0VM408236
A 14	A	LABEL, BAR CODE or	0VM407620
	A	LABEL, BAR CODE	0VM408218
A 14	B	LABEL, BAR CODE or	0VM407620
	B	LABEL, BAR CODE	0VM408240A
A 14	C	LABEL, BAR CODE or	0VM407620
	C	LABEL, BAR CODE	0VM408241
A 18	A	LABEL, TELEPHONE NUMBER	0VM405999
A 19	A,B	LABEL, VCR PLUS	0VM407738A
A 24	A	QUICK REFERANCE GUIDE	0VMN01964
A 24	B	QUICK REFERANCE GUIDE	0VMN01968
A 24	C	QUICK REFERANCE GUIDE	0VMN01958
AC 001 ⚠		AC CORD LA-1802 (See Electrical Parts List)	
1B 1		DECK ASSEMBLY or	N6062XL
		DECK ASSEMBLY	N6062FL
2B 1	A,C	HOLDER, L.E.D.(See Electrical Parts List)	
2B 2	B	HOLDER, L.E.E. 2 (See Electrical Parts List)	
2B 3		HOLDER, JRC (B) (2B3 Used only if RS501: NJL61V367S and NJL51V367) (See Electrical Parts List)	
2B 5		PLATE, SHIELD(U15)	0VM302746
2B 7		SHIELD, HEAD B (See Electrical Parts List)	
2B 8		BUSH, LED(B)(See Electrical Parts List)	
2B 9		CUSHION, LED	0VM408001
2B 14		CUSHION, PCB	0VM408145
2B 18		CUSHION, PCB	0VM407208
B 423		SHIELD PLATE MK6	0VM202015
2L 011		SCREW, P-TIGHT 3X12 BIND HEAD+	GBKP3120
2L 021		SCREW, P-TIGHT 3X12 BIND HEAD+	GBKP3120
2L 031		SCREW, P-TIGHT 3X8 BIND+	GBMP3080
L 1410		SCREW, P-TIGHT M3X25 BIND HEAD+	GBMP3250
L 1411		SCREW, S-TIGHT M3X6 BIND HEAD+	GBMS3060
		HEAD CLEANER BLOCK	0VSA08247
B 359		CLEANER LEVER MK6	0VM302716
B 360		CLEAN ROLLER MK4	0VM406123
B 361		CLEAN BEARING MK4	0VM406124

Ref. No.	Mark	Description	Part No.
		PACKING	
S 1	A	GIFT BOX CARTON	0VM302974A
S 1	B	GIFT BOX CARTON	0VM302990A
S 1	C	GIFT BOX CARTON	0VM302989
S 2		STYROFOAM	0VM100660
S 3		UNIT, BAG	0VM405960
		ACCESSORIES	
X 1	A	REMOTE CONTROL UNIT SBGN2J004A	UREMT36AL002
X 1	B	REMOTE CONTROL UNIT SBGN22008A	UREMT39AL003
X 1	C	REMOTE CONTROL UNIT 364/CRC002/4H/N/OSD	N9287UD
X 2	A,B	DRY BATTERY ER03X or	XB0M641GW001
	A,B	DRY BATTERY UM-4E(2S):B5152JA or	XB0M641FA001
	A,B	DRY BATTERY UM-4(SP) 2PCS PACK or	1790902
	A,B	DRY BATTERY UM4/R03U 2PCS PACK	579W100
X 2	C	DRY BATTERY R6P UM3 or	XB0M451GH001
	C	DRY BATTERY R6 UM3 1015 M15P or	XB0M451GW001
	C	DRY BATTERY R6P(AR)2PX or	XB0M451HU002
	C	DRY BATTERY UM3/RS6 2PCS PACK	579W099
X 3		RF CABLE FC-NTSC-1 or	5750398
		RF CABLE or	WPZ0102BB001
		RF CABLE LP960601	WPZ0102LG006
X 4		ACCESSORY BAG	0VM406620
X 20 ⚠	A	OWNER'S MANUAL	0VMN01952
X 20 ⚠	B	OWNER'S MANUAL	0VMN01956
X 20 ⚠	C	OWNER'S MANUAL	0VMN01955

ELECTRICAL PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

NOTES:

1. Parts that not assigned part numbers (----------) are not available.
2. Tolerance of Capacitors and Resistors are noted with the following symbols.

C.....±0.25%	D.....±0.5%	F.....±1%
G.....±2%	J.....±5%	K.....±10%
M.....±20%	N.....±30%	Z.....+80/-20%

Comparison Chart of Models and Marks

MODEL	MARK
SE447SG	A
LV448HG	B
LV446G	C

MCV CBA

Ref. No.	Mark	Description	Part No.
	A	**MCV CBA (Main+Function)**	0VSA08503
	B	**MCV CBA (Main+Function)**	0VSA08626
	C	**MCV CBA (Main+Function)**	0VSA08510
		Consists of the following:	
		Main CBA (MCV-A)	———
		Function CBA (MCV-B)	———
		Hi-Fi Audio CBA (AFV)	0VSA08231

Main CBA (MCV-A)

Ref. No.	Mark	Description	Part No.
		Main CBA (MCV-A)	———
		Consists of the following:	
		CAPACITORS	
C 001 ⚠		METALLIZED FILM CAP. 0.022µF/250V M or	CT2E223DC009
		METALLIZED FILM CAP. 0.022µF/275V M or	CA2E223EB001
		METALLIZED FILM CAP. 0.022µF/275V K	CT2E223DT001
C 002 ⚠		SAFETY CAP. 3300pF or	CCG2EMA0E332
		SAFETY CAP. 3300pF or	CCG2BMD0F332
		SAFETY CAP. 3300pF/125V or	CA2B332MS001
		SAFETY CAP. 3300pF	CCG2BMP0E332
C 003		ELECTROLYTIC CAP. 82µF/200V or	CA2D820NC002
		ELECTROLYTIC CAP. 82µF/200V M or	CA2D820SM005
		ELECTROLYTIC CAP. 82µF/200V M or	CA2D820SP026
		ELECTROLYTIC CAP. 82µF/200V M or	CA2D820S6005
		ELECTROLYTIC CAP. 82µF/200V M	CA2D820C4001
C 004		CERAMIC CAP. B K 220pF/500V or	CCD2JKP0B221
		CERAMIC CAP. B K 220pF/500V or	CA2J221JM002
		CERAMIC CAP. B K 220pF/500V	CCD2JKD0B221
C 005		CERAMIC CAP. B K 0.01µF/500V or	CCD2JKP0B103
		CERAMIC CAP. 0.01µF/500V	CA2J103TU001
C 006		SEMICONDUCTOR CAP. SR K 0.039µF/25V or	12Y2393S
		SEMICONDUCTOR CAP. SR K 0.039µF/25V	CDA1EKS0X393
C 007		CERAMIC CAP. B K 3300pF/50V	CCD1JKS0B332
C 008		CERAMIC CAP. B K 8200pF/50V	CCD1JKS0B822
C 009		CERAMIC CAP. F Z 0.022µF/50V	CCD1JZS0F223
C 011		ELECTROLYTIC CAP. 22µF/50V M	CE1JMASDL220
C 013		ELECTROLYTIC CAP. 4.7µF/50V M	CE1JMASDL4R7
C 017		CERAMIC CAP. B K 1000pF/50V	CCD1JKS0B102
C 018		ELECTROLYTIC CAP. 470µF/16V M	CE1CMASDL471
C 019		ELECTROLYTIC CAP. 100µF/16V M	CE1CMASDL101
C 020		ELECTROLYTIC CAP. 1000µF/10V M	CE1AMZPDL102
C 021		ELECTROLYTIC CAP. 470µF/10V M	CE1AMASDL471
C 022	B	ELECTROLYTIC CAP. 100µF/10V M	CE1AMASDL101
C 024		SEMICONDUCTOR CAP. SR K 0.022µF/25V or	12Y2223S
		SEMICONDUCTOR CAP. SR K 0.022µF/25V	CDA1EKS0X223
C 051		CHIP CERAMIC CAP. F Z 0.022µF/50V	CHE1JZB0F223
C 052		ELECTROLYTIC CAP. 0.47µF/50V M	CE1JMASDLR47
C 053		CHIP CERAMIC CAP. F Z 0.047µF/25V	CHE1EZB0F473
C 054		ELECTROLYTIC CAP. 220µF/6.3V M	CE0KMASDL221
C 055		ELECTROLYTIC CAP. 47µF/6.3V M	CE0KMASDL470
C 057		CHIP CERAMIC CAP. B K 470pF/50V	CHE1JKB0B471
C 060	B	CERAMIC CAP. F Z 0.01µF/50V	CCD1JZS0F103
C 251		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 252		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 253		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 254		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 255		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 256		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 257		CHIP CERAMIC CAP. F Z 0.047µF/25V	CHE1EZB0F473
C 258		ELECTROLYTIC CAP. 10µF/16V M H7	CE1CMASSL100
C 260		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 261		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 263		CHIP CERAMIC CAP. F Z 0.047µF/25V	CHE1EZB0F473
C 265		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 266		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 301		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 302		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 303		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 304		CHIP CERAMIC CAP. F Z 0.047µF/25V	CHE1EZB0F473
C 306		CHIP CERAMIC CAP. SL J 33pF/50V	CHE1JJBSL330
C 312		CERAMIC CAP.(AX) Y M 0.01µF/16V	CDA1CMT0Y103
C 313		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 314		CHIP CERAMIC CAP. SL J 390pF/50V	CHE1JJBSL391
C 315		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 316		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 317		ELECTROLYTIC CAP. 47µF/6.3V M H7	CE0KMASSL470
C 318		CERAMIC CAP.(AX) F Z 0.022µF/25V	CDA1EZT0F223
C 319		CERAMIC CAP.(AX) B K 180pF/50V or	CCA1JKT0B181
		CERAMIC CAP.(AX) B J 180pF/50V	CCA1JJT0B181
C 320		CERAMIC CAP.(AX) SL J 22pF/50V	CCA1JJTSL220
C 321		CHIP CERAMIC CAP. SL J 47pF/50V	CHE1JJBSL470
C 322		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 323		CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JJBSL101
C 324		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 325		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 326		ELECTROLYTIC CAP. 4.7µF/25V M H7	CE1EMASSL4R7

Ref. No.	Mark	Description	Part No.
C 327		CHIP CERAMIC CAP. F Z 0.047µF/25V	CHE1EZB0F473
C 329		ELECTROLYTIC CAP. 10µF/16V M H7	CE1CMASSL100
C 330		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 331		ELECTROLYTIC CAP. 10µF/16V M H7	CE1CMASSL100
C 332		ELECTROLYTIC CAP. 22µF/10V M H7	CE1AMASSL220
C 333		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 334		CHIP CERAMIC CAP. B K 5600pF/50V	CHE1JKB0B562
C 335		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 336		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 337		CHIP CERAMIC CAP. F Z 0.047µF/25V	CHE1EZB0F473
C 338		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 339		CERAMIC CAP.(AX) B K 820pF/50V or	CDA1JKT0B821
		CERAMIC CAP.(AX) B J 820pF/50V	CDA1JJT0B821
C 342		ELECTROLYTIC CAP. 10µF/16V M	CE1CMASDL100
C 343		ELECTROLYTIC CAP. 470µF/6.3V M	CE0KMASDL471
C 344		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 345		CHIP CERAMIC CAP. F Z 0.1µF/25V	CHE1EZB0F104
C 347		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 350		CHIP CERAMIC CAP. SL D 10pF/50V	CHE1JDBSL100
C 353		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 354		CHIP CERAMIC CAP. SL D 10pF/50V	CHE1JDBSL100
C 358		ELECTROLYTIC CAP. 100µF/6.3V M H7	CE0KMASSL101
C 401		CERAMIC CAP.(AX) F Z 0.033µF/16V	CDA1CZT0F333
C 402		CERAMIC CAP.(AX) B K 1000pF/50V or	CDA1JKT0B102
		CERAMIC CAP.(AX) B J 1000pF/50V	CDA1JJT0B102
C 403		CHIP CERAMIC CAP. B K 6800pF/50V	CHE1JKB0B682
C 404		ELECTROLYTIC CAP. 22µF/10V M H7	CE1AMASSL220
C 405		ELECTROLYTIC CAP. 3.3µF/50V M	CE1JMASDL3R3
C 406		ELECTROLYTIC CAP. 0.1µF/50V M H7	CE1JMASSL0R1
C 407		ELECTROLYTIC CAP. 22µF/10V M H7	CE1AMASSL220
C 408		*MYLAR CAP. 0.022µF/100V J or	CMA2AJP00223
		MYLAR CAP. 0.022µF/100V J	1255223
C 409		ELECTROLYTIC CAP. 22µF/10V M	CE1AMASDL220
C 410		SEMICONDUCTOR CAP. SR K 0.022µF/25V or	12Y2223S
		SEMICONDUCTOR CAP. SR K 0.022µF/25V	CDA1EKS0X223
C 411		CHIP CERAMIC CAP. F Z 0.033µF/50V	CHE1JZB0F333
C 412		CHIP CERAMIC CAP. B K 820pF/50V	CHE1JKB0B821
C 413		CHIP CERAMIC CAP. B K 2200pF/50V	CHE1JKB0B222
C 414		ELECTROLYTIC CAP. 4.7µF/25V M	CE1EMASDL4R7
C 415		ELECTROLYTIC CAP. 47µF/6.3V M H7	CE0KMASSL470
C 416		ELECTROLYTIC CAP. 22µF/10V M H7	CE1AMASSL220
C 417		CERAMIC CAP.(AX) Y M 0.01µF/16V	CDA1CMT0Y103
C 418		CERAMIC CAP.(AX) B K 1000pF/50V or	CDA1JKT0B102
		CERAMIC CAP.(AX) B J 1000pF/50V	CDA1JJT0B102
C 419		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 420		ELECTROLYTIC CAP. 47µF/6.3V M H7	CE0KMASSL470
C 501		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 502		ELECTROLYTIC CAP. 4.7µF/25V M	CE1EMASDL4R7
C 503		CHIP CERAMIC CAP. B K 1000pF/50V	CHE1JKB0B102
C 505		ELECTROLYTIC CAP. 220µF/6.3V M	CE0KMASDL221
C 506		CHIP CERAMIC CAP. B K 4700pF/50V	CHE1JKB0B472
C 507		CHIP CERAMIC CAP. F Z 0.047µF/25V	CHE1EZB0F473
C 508		CHIP CERAMIC CAP. F Z 0.022µF/50V	CHE1JZB0F223
C 509		ELECTROLYTIC CAP. 47µF/6.3V M	CE0KMASDL470
C 510		CHIP CERAMIC CAP. SL J 330pF/50V	CHE1JJBSL331
C 511		CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JJBSL101
C 512		ELECTROLYTIC CAP. 10µF/16V M	CE1CMASDL100
C 513		CHIP CERAMIC CAP. B K 1000pF/50V	CHE1JKB0B102
C 514		CHIP CERAMIC CAP. SL J 330pF/50V	CHE1JJBSL331
C 515		CHIP CERAMIC CAP. SL J 120pF/50V	CHE1JJBSL121
C 516		CHIP CERAMIC CAP. SL J 220pF/50V	CHE1JJBSL221
C 517		CHIP CERAMIC CAP. SL J 180pF/50V	CHE1JJBSL181
C 519		ELECTROLYTIC CAP. 10µF/16V M	CE1CMASDL100

Ref. No.	Mark	Description	Part No.
C 520		ELECTROLYTIC CAP. 0.1µF/50V M H7	CE1JMASSL0R1
C 521		CHIP CERAMIC CAP. F Z 0.022µF/50V	CHE1JZB0F223
C 525		CHIP CERAMIC CAP. F Z 0.022µF/50V	CHE1JZB0F223
C 531		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 532		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 535		ELECTROLYTIC CAP. 220µF/6.3V M H7	CE0KMASSL221
C 538		ELECTROLYTIC CAP. 47µF/6.3V M	CE0KMASDL470
C 539		CHIP CERAMIC CAP. F Z 0.022µF/50V	CHE1JZB0F223
C 540		CHIP CERAMIC CAP. F Z 0.022µF/50V	CHE1JZB0F223
C 542		CHIP CERAMIC CAP. F Z 0.022µF/50V	CHE1JZB0F223
C 547		CHIP CERAMIC CAP. SL J 27pF/50V	CHE1JJBSL270
C 548		ELECTROLYTIC CAP. 22µF/10V M H7	CE1AMASSL220
C 549		CHIP CERAMIC CAP. F Z 0.022µF/50V	CHE1JZB0F223
C 550		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 551		CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JJBSL220
C 552		CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JJBSL220
C 553		CHIP CERAMIC CAP. F Z 0.1µF/25V	CHE1EZB0F104
C 554		ELECTROLYTIC CAP. 10µF/25V M	CE1EMASDL100
C 555		CERAMIC CAP.(AX) Y M 0.01µF/16V (C555 Used only if IC507B: LB1641)	CDA1CMT0Y103
C 556		CHIP CERAMIC CAP. F Z 0.022µF/50V	CHE1JZB0F223
C 575		ELECTROLYTIC CAP. 10µF/16V M H7	CE1CMASSL100
C 576		CERAMIC CAP.(AX) SL J 22pF/50V	CCA1JJTSL220
C 701		CHIP CERAMIC CAP. F Z 0.1µF/25V	CHE1EZB0F104
C 702		CHIP CERAMIC CAP. SL J 47pF/50V	CHE1JJBSL470
C 703		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 705		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 706		ELECTROLYTIC CAP. 330µF/16V M	CE1CMASDL331
C 707		CHIP CERAMIC CAP. B K 1000pF/50V	CHE1JKB0B102
C 708		ELECTROLYTIC CAP. 4.7µF/25V M	CE1EMASDL4R7
C 710		ELECTROLYTIC CAP. 0.22µF/50V M	CE1JMASDLR22
C 712		CERAMIC CAP.(AX) SL J 56pF/50V	CCA1JJTSL560
C 716		CERAMIC CAP.(AX) B K 100pF/50V or	CCA1JKT0B101
		CERAMIC CAP.(AX) B J 100pF/50V	CCA1JJT0B101
C 751		ELECTROLYTIC CAP. 47µF/6.3V M H7	CE0KMASSL470
C 851		CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 853		CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JJBSL220
C 854		CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JJBSL220
C 855		ELECTROLYTIC CAP. 1µF/50V M H7	CE1JMASSL010
C 856		CHIP CERAMIC CAP. SL J 220pF/50V	CHE1JJBSL221
C 858		CHIP CERAMIC CAP. F Z 0.1µF/25V	CHE1EZB0F104
C 580A		CERAMIC CAP.(AX) B K 100pF/50V or	CCA1JKT0B101
		CERAMIC CAP.(AX) B J 100pF/50V	CCA1JJT0B101
C 580C		CERAMIC CAP.(AX) B K 1000pF/50V or	CDA1JKT0B102
		CERAMIC CAP.(AX) B J 1000pF/50V	CDA1JJT0B102
C 711A		ELECTROLYTIC CAP. 10µF/16V M (C711A Used only if TU701: VA075AP, NJH3091U004 and TMLH2-009A)	CE1CMASDL100
C 711B		ELECTROLYTIC CAP. 470µF/6.3V M (C711B Used only if TU701: NJH3091U001)	CE0KMASDL471
		CONNECTORS	
CN 502		FFC CONNECTOR BASE, TOP 9P	JC04J09ER002
CN 503		CONNECTOR, 9P	J3TKA09TG001
CN 504		CONNECTOR, 6P	J3TKA06TG001
CN 505		FFC CONNECTOR BASE, TOP 9P	JC04J09ER002
CN 507		STRAIGHT PIN CONNECTOR, 3P	1770623
CN501B		CABLE CONNECTOR, 2P	JCTMC02TG001
		DIODES	
D 001		RECTIFIER DIODE 1N4005 or	NDQZ001N4005
		RECTIFIER DIODE 1N4005	ND8Z001N4005
D 002		RECTIFIER DIODE 1N4005 or	NDQZ001N4005
		RECTIFIER DIODE 1N4005	ND8Z001N4005
D 003		RECTIFIER DIODE 1N4005 or	NDQZ001N4005
		RECTIFIER DIODE 1N4005	ND8Z001N4005
D 004		RECTIFIER DIODE 1N4005 or	NDQZ001N4005

* Mylar is a registered trademark of E. I. DuPont de Nemours and Company.

Ref. No.	Mark	Description	Part No.
		RECTIFIER DIODE 1N4005	ND8Z001N4005
D 005		FAST RECOVERY DIODE PR1004 or	NDQZ00PR1004
		FAST RECOVERY DIODE ERA18-04	QDPZ0ERA1804
D 006		SWITCHING DIODE 1N4148M or	NDTZ01N4148M
		SWITCHING DIODE 1N4148M or	QDTZ01N4148M
		SWITCHING DIODE GMB01-BT	GMB01BT
D 007		SWITCHING DIODE 1N4148M or	NDTZ01N4148M
		SWITCHING DIODE 1N4148M or	QDTZ01N4148M
		SWITCHING DIODE GMB01-BT	GMB01BT
D 008		SWITCHING DIODE 1N4148M or	NDTZ01N4148M
		SWITCHING DIODE 1N4148M or	QDTZ01N4148M
		SWITCHING DIODE GMB01-BT	GMB01BT
D 012		FAST RECOVERY DIODE PR1004 or	NDQZ00PR1004
		FAST RECOVERY DIODE ERA18-04	QDPZ0ERA1804
D 013		FAST RECOVERY DIODE PR1004 or	NDQZ00PR1004
		FAST RECOVERY DIODE ERA18-04	QDPZ0ERA1804
D 015		RECTIFIER DIODE PR3002 or	NDQZ00PR3002
		FAST RECOVERY DIODE ERB32-01	QDPZ0ERB3201
D 016		SCHOTTKY BARRIER DIODE SB340 or	NDQZ000SB340
		SCHOTTKY BARRIER DIODE RK33 or	QDPZ0000RK33
		SCHOTTKY BARRIER DIODE RK34	QDPZ0000RK34
D 017	B	FAST RECOVERY DIODE PR1004 or	NDQZ00PR1004
	B	FAST RECOVERY DIODE ERA18-04	QDPZ0ERA1804
D 018		ZENER DIODE UZ-9.1BSC	QDTC0UZ9R1BS
D 052		SWITCHING DIODE 1N4148M or	NDTZ01N4148M
		SWITCHING DIODE 1N4148M or	QDTZ01N4148M
		SWITCHING DIODE GMB01-BT	GMB01BT
D 053		ZENER DIODE UZ-9.1BSC	QDTC0UZ9R1BS
D 054		SWITCHING DIODE 1N4148M or	NDTZ01N4148M
		SWITCHING DIODE 1N4148M or	QDTZ01N4148M
		SWITCHING DIODE GMB01-BT	GMB01BT
D 055		RECTIFIER DIODE 1N4005 or	NDQZ001N4005
		RECTIFIER DIODE 1N4005	ND8Z001N4005
D 057		SWITCHING DIODE 1N4148M or	NDTZ01N4148M
		SWITCHING DIODE 1N4148M or	QDTZ01N4148M
		SWITCHING DIODE GMB01-BT	GMB01BT
D 058		ZENER DIODE UZ-30BSB	QDTB00UZ30BS
D 059	B	ZENER DIODE UZ-6.8BSA	QDTA0UZ6R8BS
D 301		SWITCHING DIODE 1N4148M or	NDTZ01N4148M
		SWITCHING DIODE 1N4148M or	QDTZ01N4148M
		SWITCHING DIODE GMB01-BT	GMB01BT
D 302		SWITCHING DIODE 1N4148M or	NDTZ01N4148M
		SWITCHING DIODE 1N4148M or	QDTZ01N4148M
		SWITCHING DIODE GMB01-BT	GMB01BT
D 303		SWITCHING DIODE 1N4148M or	NDTZ01N4148M
		SWITCHING DIODE 1N4148M or	QDTZ01N4148M
		SWITCHING DIODE GMB01-BT	GMB01BT
D 304		SWITCHING DIODE 1N4148M or	NDTZ01N4148M
		SWITCHING DIODE 1N4148M or	QDTZ01N4148M
		SWITCHING DIODE GMB01-BT	GMB01BT
D 501		SWITCHING DIODE 1N4148M or	NDTZ01N4148M
		SWITCHING DIODE 1N4148M or	QDTZ01N4148M
		SWITCHING DIODE GMB01-BT	GMB01BT
D 502		SWITCHING DIODE 1N4148M or	NDTZ01N4148M
		SWITCHING DIODE 1N4148M or	QDTZ01N4148M
		SWITCHING DIODE GMB01-BT	GMB01BT
D 503		PCB JUMPER D0.6-P5.0	JW5.0T
D 504		PCB JUMPER D0.6-P5.0	JW5.0T
D 510		SWITCHING DIODE 1N4148M or	NDTZ01N4148M
		SWITCHING DIODE 1N4148M or	QDTZ01N4148M
		SWITCHING DIODE GMB01-BT	GMB01BT
D 511		LED SLR-938CV-7 or	QPQSSLR938CV
		LED SLR-938CV-A	QPQASLR938CV
D 519	A,C	LED(RED) L-934HD or	NP4Z00L934HD
	A,C	LED(RED) CSL-360H1GT	NPQZCSL360H1
D 520	A,C	LED(RED) L-934HD or	NP4Z00L934HD
	A,C	LED(RED) CSL-360H1GT	NPQZCSL360H1
D 521	A,C	LED(GREEN) L-934GD or	NP4Z00L934GD
	A,C	LED(GREEN) CSL-360G1GT	NPQZCSL360G1
D 522	A,C	LED(RED) L-934HD or	NP4Z00L934HD
	A,C	LED(RED) CSL-360H1GT	NPQZCSL360H1
D 523	A,C	LED(GREEN) L-934GD or	NP4Z00L934GD
	A,C	LED(GREEN) CSL-360G1GT	NPQZCSL360G1
D 701		ZENER DIODE UZ-33BSD	QDTD00UZ33BS
		ICS	
IC 001 ⚠		PHOTOCOUPLER PC-17T1 or	QPE100PC17T1
		PHOTOCOUPLER PS2501-1D or	QPED0PS25011
		PHOTOCOUPLER PS2501-1H or	QPEH0PS25011
		PHOTOCOUPLER PS2501-1L or	QPEL0PS25011
		PHOTOCOUPLER PS2501-1M or	QPEM0PS25011
		PHOTOCOUPLER PS2501-1W or	QPEW0PS25011
		PHOTOCOUPLER PC817(A) or	QPPA000PC817
		PHOTOCOUPLER PC817(B) or	QPPB000PC817
		PHOTO COUPLER PC817(AB) or	QPP1000PC817
		PHOTO COUPLER TLP521-1(GR)	QPE10TLP5211
IC 002		IC KA431Z or	NSZLA0ZSM001
		IC KIA431	NSZLA0ZJY001
IC 251		IC, HEAD AMP LA70020	QSBLA0SSY064
IC 301		IC:VIDEO LA71020M	QSBLA0RSY061
IC 501	A,B	MICROCONTROLLER 16BIT SY/M37775M7H141GP	QSMQB0RMB144
IC 501	C	MICROCONTROLLER 16BIT SY/M37779M5A117GP	QSMQC0RMB121
IC 502		IC:COMPARATOR LM339N or	NSBLA0SSS008
		IC:COMPARATOR KIA339P or	NSBLA0SJY019
		IC:COMPARATOR NJM2901N	QSBLA0SJR040
IC 503		IC:OP-AMP. LM324N or	NSBLA0SSS007
		IC:OP AMP NJM324D	QSBLA0SJR039
IC 505	A,B	IC X24C01AP or	NSMMA0SXC002
	A,B	IC ST24C01CB1 or	NSMMA0ZSS002
	A,B	IC:MEMORY 24LC01B/P	NSMMA0SMH002
IC 751		IC HCF4052BEY or	NSMLA0SSS003
		IC NJU4052BD or	14D0438
		IC TC4052BP or	QSMLA0STS003
		IC UPD4052BC	QSMLA0SNE004
IC 851		IC, ON SCREEN LC74723-9068	QSMGA0SSY009
IC507A		IC TA7291S (Not Used C555)	14LW342
IC507B		IC LB1641 (Used C555)	QSBLA0SSY045
		COILS	
L 001 ⚠		LINE FILTER 33MH 53229 or	LLBG00ZKT001
		LINE FILTER 33MH 110-TXH-030X or	LLBG00ZF8002
		LINE FILTER 33MH UU10LF	LLBG00ZSF002
L 002		BEAD CORE B16 RH 3.5X10X1.3	XL03010XM001
L 003		BEAD CORE B16 RH 3.5X3X1.3	XL03003XM002
L 004		BEAD CORE B16 RH 3.5X3X1.3	XL03003XM002
L 007		BEAD CORE B16 RH 4X3X2 or	XL03003XM001
		BEAD CORE HF70BB4.1X3X2	XL03003TE001
L 008		LEAD INDUCTOR 22µH K or	LLARKMPKV220
		LEAD INDUCTOR 22µH K	LLARKMUTU220
L 009		LEAD INDUCTOR 22µH K or	LLARKMPKV220
		LEAD INDUCTOR 22µH K	LLARKMUTU220
L 252		INDUCTOR 22µH K 26T or	LLAXKATTU220
		INDUCTOR 22µH K 26T	LLAXKDTKA220
L 304		INDUCTOR 56µH K 26T or	LLAXKATTU560
		INDUCTOR 56µH K 26T	LLAXKDTKA560
L 306		PCB JUMPER D0.6-P5.0	JW5.0T
L 307		INDUCTOR 22µH K 5FT or	LLARKBSTU220
		INDUCTOR 22µH K 5FT or	LLARKMSFS220
		INDUCTOR 22µH K 5FT	LLARKDSKA220
L 502		INDUCTOR 12µH K 26T or	LLAXKATTU120
		INDUCTOR 12µH K 26T	LLAXKDTKA120
L 504		PCB JUMPER D0.6-P5.0	JW5.0T

Ref. No.	Mark	Description	Part No.
L 505		INDUCTOR 100µH K 26T or	LLAXKATTU101
		INDUCTOR 100µH K 26T	LLAXKDTKA101
L 506		INDUCTOR 100µH K 26T or	LLAXKATTU101
		INDUCTOR 100µH K 26T	LLAXKDTKA101
L 507		PCB JUMPER D0.6-P7.5	JW7.5T
L 702		INDUCTOR 18µH K 5FT or	LLARKBSTU180
		INDUCTOR 18µH K 5FT or	LLARKMSFS180
		INDUCTOR 18µH K 5FT	LLARKDSKA180
L 703		PCB JUMPER D0.6-P5.0	JW5.0T
L 705		INDUCTOR 15µH K 26T or	LLAXKATTU150
		INDUCTOR 15µH K 26T	LLAXKDTKA150
L 706		INDUCTOR 100µH K 26T or	LLAXKATTU101
		INDUCTOR 100µH K 26T	LLAXKDTKA101
L 851		INDUCTOR 18µH J 26T or	LLAXJATTU180
		INDUCTOR 18µH J 26T	LLAXJDTKA180
L 852		PCB JUMPER D0.6-P5.0	JW5.0T
L 853		INDUCTOR 4.7µH K 26T or	LLAXKATTU4R7
		INDUCTOR 4.7µH K 26T	LLAXKDTKA4R7
T 401		COIL, OSC 7L1A48A or	LFA08V0LH003
		COIL, OSC 15916B	LFA07V0VD009
TRANSISTORS			
Q 001⚠		TRANSISTOR KSC5020(O) or	NQQ00KSC5020
		TRANSISTOR KSC5020(R) or	NQQR0KSC5020
		TRANSISTOR 2SC4953 or	QQQZ02SC4953
		TRANSISTOR 2SC4418	QQPZ02SC4418
Q 002⚠		TRANSISTOR 2SC3576 or	QQSZ02SC3576
		TRANSISTOR 2SC4204-AA	QQSZ02SC4204
Q 053		TRANSISTOR 2SD734F-NP-AQ or	QQSF002SD734
		TRANSISTOR 2SD734G-NP-AQ	QQSG002SD734
Q 054		TRANSISTOR KTC3199(Y) or	NQSY0KTC3199
		TRANSISTOR KTC3199(GR) or	NQS10KTC3199
		TRANSISTOR KSC2785(Y) or	NQSY0KSC2785
		TRANSISTOR KSC2785(G) or	NQSG0KSC2785
		TRANSISTOR 2SC536SP(E) or	C536SEZ
		TRANSISTOR 2SC536SP(F)	C536SFZ
Q 055		RES. BUILT-IN TRANSISTOR KRA103M or	NQSZ0KRA103M
		RES. BUILT-IN TRANSISTOR KSR2203 or	NQSZ0KSR2203
		RES. BUILT-IN TRANSISTOR 2SA1346	A1346Z
Q 303		RES. BUILT-IN TRANSISTOR KRC103M or	NQSZ0KRC103M
		RES. BUILT-IN TRANSISTOR KSR1203 or	NQSZ0KSR1203
		RES. BUILT-IN TRANSISTOR 2SC3400	C3400Z
Q 304		TRANSISTOR KTC3199(Y) or	NQSY0KTC3199
		TRANSISTOR KTC3199(GR) or	NQS10KTC3199
		TRANSISTOR KSC2785(Y) or	NQSY0KSC2785
		TRANSISTOR KSC2785(G) or	NQSG0KSC2785
		TRANSISTOR 2SC536SP(E) or	C536SEZ
		TRANSISTOR 2SC536SP(F)	C536SFZ
Q 305		TRANSISTOR KTC3193(Y) or	NQSY0KTC3193
		TRANSISTOR 2SC2839(E) or	C2839EZ
		TRANSISTOR 2SC2839(F)	C2839FZ
Q 307		TRANSISTOR KTC3193(Y) or	NQSY0KTC3193
		TRANSISTOR 2SC2839(E) or	C2839EZ
		TRANSISTOR 2SC2839(F)	C2839FZ
Q 308		TRANSISTOR KTA1266(Y) or	NQSY0KTA1266
		TRANSISTOR KTA1266(GR) or	NQS40KTA1266
		TRANSISTOR 2SA1317(S) or	A1317SZ
		TRANSISTOR 2SA1317(T)	A1317TZ
Q 310		TRANSISTOR KTC3199(Y) or	NQSY0KTC3199
		TRANSISTOR KTC3199(GR) or	NQS10KTC3199
		TRANSISTOR KSC2785(Y) or	NQSY0KSC2785
		TRANSISTOR KSC2785(G) or	NQSG0KSC2785
		TRANSISTOR 2SC536SP(E) or	C536SEZ
		TRANSISTOR 2SC536SP(F)	C536SFZ

Ref. No.	Mark	Description	Part No.
Q 311		TRANSISTOR KTC3193(Y) or	NQSY0KTC3193
		TRANSISTOR 2SC2839(E) or	C2839EZ
		TRANSISTOR 2SC2839(F)	C2839FZ
Q 401		TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
		TRANSISTOR 2SC3331(U)	QSC3331UNPAA
Q 402		TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
		TRANSISTOR 2SC3331(U)	QSC3331UNPAA
Q 403		TRANSISTOR 2SD734F-NP-AQ or	QQSF002SD734
		TRANSISTOR 2SD734G-NP-AQ	QQSG002SD734
Q 404		RES. BUILT-IN TRANSISTOR KRA103M or	NQSZ0KRA103M
		RES. BUILT-IN TRANSISTOR KSR2203 or	NQSZ0KSR2203
		RES. BUILT-IN TRANSISTOR 2SA1346	A1346Z
Q 405		TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
		TRANSISTOR 2SC3331(U)	QSC3331UNPAA
Q 501		RES. BUILT-IN TRANSISTOR KRA103M or	NQSZ0KRA103M
		RES. BUILT-IN TRANSISTOR KSR2203 or	NQSZ0KSR2203
		RES. BUILT-IN TRANSISTOR 2SA1346	A1346Z
Q 503		PHOTO TRANSISTOR ST-316R2-B	QP4B0ST316R2
Q 504		PHOTO TRANSISTOR ST-316R2-B	QP4B0ST316R2
Q 511		TRANSISTOR KTC3199(BL) or	NQS50KTC3199
		TRANSISTOR KSC2785(L) or	NQSL0KSC2785
		TRANSISTOR 2SC536SP(G)	QQSGSC536SPA
Q 514		PHOTO TRANSISTOR PT380FAB or	QP7ZPT380FAB
		PHOTO TRANSISTOR ST-319R2-B	QP4B0ST319R2
Q 851		TRANSISTOR KTA1267(Y) or	NQSY0KTA1267
		TRANSISTOR KTA1267(GR) or	NQS10KTA1267
		TRANSISTOR KSA1175(Y) or	NQSY0KSA1175
		TRANSISTOR KSA1175(G) or	NQSG0KSA1175
		TRANSISTOR 2SA608SP(E) or	A608SEZ
		TRANSISTOR 2SA608SP(F)	A608SFZ
RESISTORS			
R 002		PCB JUMPER D0.6-P15.0	JW15.0T
R 003		CARBON RES. 1/4W J 56k Ω	RCX4JATZ0563
R 004		CARBON RES. 1/4W J 56k Ω	RCX4JATZ0563
R 005		CARBON RES. 1/4W J 56k Ω	RCX4JATZ0563
R 008		FIXED METAL OXIDE FILM RES. 1W J 82 Ω or	RN01820KE009
		FIXED METAL OXIDE FILM RES. 1W J 82 Ω or	RN01820HH001
		FIXED METAL OXIDE FILM RES. 1W J 82 Ω	1330412
R 011		FIXED METAL OXIDE FILM RES. 2W J 33k Ω	1330508
R 012		CARBON RES. 1/6W J 3.9k Ω or	RCX6JATZ0392
		CARBON RES. 1/4W J 3.9k Ω	RCX4JATZ0392
R 014		FIXED METAL OXIDE FILM RES. 1W J 0.91 Ω or	RN01R91KE009
		METAL FILM RES. 1W J 0.91 Ω	RM01R91KA004
R 015		CARBON RES. 1/6W J 470 Ω or	RCX6JATZ0471
		CARBON RES. 1/4W J 470 Ω	RCX4JATZ0471
R 016		CARBON RES. 1/4W J 1k Ω	RCX4JATZ0102
R 021	A,C	PCB JUMPER D0.6-P5.0	JW5.0T
R 021	B	CARBON RES. 1/4W J 4.7k Ω	RCX4JATZ0472
R 022		CARBON RES. 1/4W J 820 Ω	RCX4JATZ0821
R 023		CARBON RES. 1/4W J 1k Ω	RCX4JATZ0102
R 024		CARBON RES. 1/4W J 820 Ω	RCX4JATZ0821
R 025		CARBON RES. 1/4W G 2.2k Ω	RCX4GATZ0222
R 026		CARBON RES. 1/4W G 1.5k Ω	RCX4GATZ0152
R 051	B	CARBON RES. 1/4W J 330 Ω	RCX4JATZ0331
R 052	B	CARBON RES. 1/4W J 330 Ω	RCX4JATZ0331
R 056		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 058		CARBON RES. 1/4W J 4.7k Ω	RCX4JATZ0472
R 059		CARBON RES. 1/4W J 4.7k Ω	RCX4JATZ0472

Ref. No.	Mark	Description	Part No.
R 060		CARBON RES. 1/4W J 4.7k Ω	RCX4JATZ0472
R 061		CARBON RES. 1/4W J 180 Ω	RCX4JATZ0181
R 062	B	CARBON RES. 1/4W J 6.8 Ω	RCX4JATZ06R8
R 063	B	CARBON RES. 1/4W J 6.8 Ω	RCX4JATZ06R8
R 064		CARBON RES. 1/6W J 100k Ω or	RCX6JATZ0104
		CARBON RES. 1/4W J 100k Ω	RCX4JATZ0104
R 065		CARBON RES. 1/4W J 820 Ω	RCX4JATZ0821
R 066		CHIP RES. 1/10W J 100k Ω	RRXAJBBZ0104
R 070	B	CARBON RES. 1/4W J 6.8 Ω	RCX4JATZ06R8
R 071	B	CARBON RES. 1/4W J 6.8 Ω	RCX4JATZ06R8
R 251		CHIP RES. 1/10W G 1.5k Ω	RRXAGBBZ0152
R 252		CHIP RES. 1/10W J 470 Ω	RRXAJBBZ0471
R 253		CHIP RES. 1/10W J 470 Ω	RRXAJBBZ0471
R 254		CHIP RES. 1/10W J 6.8k Ω	RRXAJBBZ0682
R 255		CHIP RES. 1/10W J 3.9k Ω	RRXAJBBZ0392
R 260		CARBON RES. 1/6W J 1.5k Ω or	RCX6JATZ0152
		CARBON RES. 1/4W J 1.5k Ω	RCX4JATZ0152
R 261		CARBON RES. 1/6W J 470 Ω or	RCX6JATZ0471
		CARBON RES. 1/4W J 470 Ω	RCX4JATZ0471
R 301		CARBON RES. 1/6W J 2.2k Ω or	RCX6JATZ0222
		CARBON RES. 1/4W J 2.2k Ω	RCX4JATZ0222
R 302		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
R 305		CARBON RES. 1/4W J 820 Ω	RCX4JATZ0821
R 306		CARBON RES. 1/4W J 1k Ω	RCX4JATZ0102
R 313		CHIP RES. 1/10W J 2.7k Ω	RRXAJBBZ0272
R 314		CHIP RES. 1/10W J 680 Ω	RRXAJBBZ0681
R 315		CARBON RES. 1/4W J 4.7k Ω	RCX4JATZ0472
R 316		CHIP RES. 1/10W J 1.5k Ω	RRXAJBBZ0152
R 317		CARBON RES. 1/6W J 2.2k Ω or	RCX6JATZ0222
		CARBON RES. 1/4W J 2.2k Ω	RCX4JATZ0222
R 318		CHIP RES. 1/10W J 1.8k Ω	RRXAJBBZ0182
R 319		CHIP RES. 1/10W J 1.8k Ω	RRXAJBBZ0182
R 321		CHIP RES. 1/10W J 100 Ω	RRXAJBBZ0101
R 322		CHIP RES. 1/10W J 6.8k Ω	RRXAJBBZ0682
R 323		CHIP RES. 1/10W J 10k Ω	RRXAJBBZ0103
R 324		CHIP RES. 1/10W J 12k Ω	RRXAJBBZ0123
R 326		CHIP RES. 1/10W J 12k Ω	RRXAJBBZ0123
R 327		CARBON RES. 1/6W J 33k Ω or	RCX6JATZ0333
		CARBON RES. 1/4W J 33k Ω	RCX4JATZ0333
R 328		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
R 329		CHIP RES. 1/10W J 4.7k Ω	RRXAJBBZ0472
R 330		CHIP RES. 1/10W J 8.2k Ω	RRXAJBBZ0822
R 331		CHIP RES. 1/10W J 10k Ω	RRXAJBBZ0103
R 332		CHIP RES. 1/10W J 10k Ω	RRXAJBBZ0103
R 334		CARBON RES. 1/4W J 820 Ω	RCX4JATZ0821
R 335		CARBON RES. 1/6W J 680 Ω or	RCX6JATZ0681
		CARBON RES. 1/4W J 680 Ω	RCX4JATZ0681
R 336		CARBON RES. 1/6W J 680 Ω or	RCX6JATZ0681
		CARBON RES. 1/4W J 680 Ω	RCX4JATZ0681
R 337		CARBON RES. 1/6W J 680 Ω or	RCX6JATZ0681
		CARBON RES. 1/4W J 680 Ω	RCX4JATZ0681
R 338		PCB JUMPER D0.6-P5.0	JW5.0T
R 340		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
R 341		CHIP RES. 1/10W J 3.3k Ω	RRXAJBBZ0332
R 342		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
R 343		CHIP RES. 1/10W J 3.3k Ω	RRXAJBBZ0332
R 347		CHIP RES. 1/10W J 680 Ω	RRXAJBBZ0681
R 348		CHIP RES. 1/10W J 680 Ω	RRXAJBBZ0681
R 349		CHIP RES. 1/10W J 15k Ω	RRXAJBBZ0153
R 350		CHIP RES. 1/10W J 2.2k Ω	RRXAJBBZ0222
R 351		CHIP RES. 1/10W J 6.8k Ω	RRXAJBBZ0682
R 401		CHIP RES. 1/10W J 15k Ω	RRXAJBBZ0153
R 402		CARBON RES. 1/6W J 15k Ω or	RCX6JATZ0153
		CARBON RES. 1/4W J 15k Ω	RCX4JATZ0153
R 403		CHIP RES. 1/10W J 2.2k Ω	RRXAJBBZ0222
R 404		CHIP RES. 1/10W J 2.2k Ω	RRXAJBBZ0222

Ref. No.	Mark	Description	Part No.
R 405		CHIP RES. 1/10W J 6.8k Ω	RRXAJBBZ0682
R 406		CHIP RES. 1/10W J 2.2M Ω	RRXAJBBZ0225
R 407		CARBON RES. 1/6W J 1.3k Ω or	RCX6JATZ0132
		CARBON RES. 1/4W J 1.3k Ω	RCX4JATZ0132
R 408		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
R 409		CHIP RES. 1/10W J 2.2 Ω	RRXAJBBZ02R2
R 410		CHIP RES. 1/10W J 47 Ω	RRXAJBBZ0470
R 411		CARBON RES. 1/6W J 2.2k Ω or	RCX6JATZ0222
		CARBON RES. 1/4W J 2.2k Ω	RCX4JATZ0222
R 412		CHIP RES. 1/10W J 2.2k Ω	RRXAJBBZ0222
R 413		CARBON RES. 1/4W J 180 Ω	RCX4JATZ0181
R 414		CHIP RES. 1/10W J 22k Ω	RRXAJBBZ0223
R 415		CHIP RES. 1/10W J 180 Ω	RRXAJBBZ0181
R 416		CHIP RES. 1/10W J 330k Ω	RRXAJBBZ0334
R 417		CARBON RES. 1/6W J 12k Ω or	RCX6JATZ0123
		CARBON RES. 1/4W J 12k Ω	RCX4JATZ0123
R 418		CHIP RES. 1/10W J 8.2k Ω	RRXAJBBZ0822
R 419		CHIP RES. 1/10W J 12k Ω	RRXAJBBZ0123
R 420		PCB JUMPER D0.6-P5.0	JW5.0T
R 501		CARBON RES. 1/4W J 4.7k Ω	RCX4JATZ0472
R 502		CARBON RES. 1/6W J 4.7M Ω or	RCX6JATZ0475
		CARBON RES. 1/4W J 4.7M Ω	RCX4JATZ0475
R 503		CHIP RES. 1/10W J 47k Ω	RRXAJBBZ0473
R 504		CHIP RES. 1/10W J 330k Ω	RRXAJBBZ0334
R 505		CARBON RES. 1/6W J 5.6k Ω or	RCX6JATZ0562
		CARBON RES. 1/4W J 5.6k Ω	RCX4JATZ0562
R 506		CHIP RES. 1/10W J 10k Ω	RRXAJBBZ0103
R 507		CHIP RES. 1/10W J 10k Ω	RRXAJBBZ0103
R 508		CARBON RES. 1/6W J 2.2k Ω or	RCX6JATZ0222
		CARBON RES. 1/4W J 2.2k Ω	RCX4JATZ0222
R 509		CHIP RES. 1/10W J 2.2k Ω	RRXAJBBZ0222
R 510		CARBON RES. 1/4W J 4.7k Ω	RCX4JATZ0472
R 512		PCB JUMPER D0.6-P5.0	JW5.0T
R 513		CARBON RES. 1/4W J 4.7k Ω	RCX4JATZ0472
R 514		CHIP RES. 1/10W J 4.7k Ω	RRXAJBBZ0472
R 515		CHIP RES. 1/10W J 10k Ω	RRXAJBBZ0103
R 516		CHIP RES. 1/10W J 330k Ω	RRXAJBBZ0334
R 517		CHIP RES. 1/10W J 4.7k Ω	RRXAJBBZ0472
R 518		CARBON RES. 1/4W J 4.7k Ω	RCX4JATZ0472
R 519		CHIP RES. 1/10W J 10k Ω	RRXAJBBZ0103
R 520		CHIP RES. 1/10W J 4.7k Ω	RRXAJBBZ0472
R 521		CARBON RES. 1/6W J 1.2k Ω or	RCX6JATZ0122
		CARBON RES. 1/4W J 1.2k Ω	RCX4JATZ0122
R 522		CHIP RES. 1/10W J 560k Ω	RRXAJBBZ0564
R 523		CHIP RES. 1/10W J 10k Ω	RRXAJBBZ0103
R 524		CHIP RES. 1/10W J 470 Ω	RRXAJBBZ0471
R 526		CHIP RES. 1/10W J 68k Ω	RRXAJBBZ0683
R 527		CHIP RES. 1/10W J 10k Ω	RRXAJBBZ0103
R 528		CHIP RES. 1/10W J 10k Ω	RRXAJBBZ0103
R 529		CHIP RES. 1/10W J 330k Ω	RRXAJBBZ0334
R 530		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 531		CHIP RES. 1/10W J 56k Ω	RRXAJBBZ0563
R 532		CHIP RES. 1/10W J 27k Ω	RRXAJBBZ0273
R 533		CARBON RES. 1/6W J 390k Ω or	RCX6JATZ0394
		CARBON RES. 1/4W J 390k Ω	RCX4JATZ0394
R 534		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 535		CHIP RES. 1/10W J 7.5k Ω	RRXAJBBZ0752
R 536		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 543		CARBON RES. 1/4W J 1k Ω	RCX4JATZ0102
R 544		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
R 545		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 546		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103

Ref. No.	Mark	Description	Part No.
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 547		CARBON RES. 1/4W G 4.7k Ω	RCX4GATZ0472
R 548		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 549		CHIP RES. 1/10W J 4.7k Ω	RRXAJBBZ0472
R 550		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
R 551		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
R 553		CARBON RES. 1/6W J 8.2k Ω or	RCX6JATZ0822
		CARBON RES. 1/4W J 8.2k Ω	RCX4JATZ0822
R 554		CHIP RES. 1/10W J 18k Ω	RRXAJBBZ0183
R 555		CARBON RES. 1/6W J 3.3k Ω or	RCX6JATZ0332
		CARBON RES. 1/4W J 3.3k Ω	RCX4JATZ0332
R 559		CARBON RES. 1/6W J 39k Ω or	RCX6JATZ0393
		CARBON RES. 1/4W J 39k Ω	RCX4JATZ0393
R 562		CARBON RES. 1/6W J 100 Ω or	RCX6JATZ0101
		CARBON RES. 1/4W J 100 Ω	RCX4JATZ0101
R 563		CARBON RES. 1/4W J 150 Ω	RCX4JATZ0151
R 564		CARBON RES. 1/4W J 150 Ω	RCX4JATZ0151
R 565		CARBON RES. 1/6W J 680k Ω or	RCX6JATZ0684
		CARBON RES. 1/4W J 680k Ω	RCX4JATZ0684
R 566		CARBON RES. 1/6W J 680k Ω or	RCX6JATZ0684
		CARBON RES. 1/4W J 680k Ω	RCX4JATZ0684
R 576		CHIP RES. 1/10W J 100k Ω	RRXAJBBZ0104
R 577		CHIP RES. 1/10W J 2.2k Ω	RRXAJBBZ0222
R 578		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
R 579		CHIP RES. 1/10W J 47 Ω	RRXAJBBZ0470
R 580		CHIP RES. 1/10W J 100k Ω	RRXAJBBZ0104
R 581		CHIP RES. 1/10W J 10M Ω	RRXAJBBZ0106
R 582		CHIP RES. 1/10W J 330k Ω	RRXAJBBZ0334
R 583		FIXED METAL OXIDE FILM RES. 1W J 2.7 Ω or	RN012R7KE009
		FIXED METAL OXIDE FILM RES. 1W J 2.7 Ω or	RN012R7HH001
		METAL FILM RES. 1W J 2.7 Ω	1330394
R 586		PCB JUMPER D0.6-P5.0	JW5.0T
R 588	A,C	CARBON RES. 1/6W J 680 Ω or	RCX6JATZ0681
	A,C	CARBON RES. 1/4W J 680 Ω	RCX4JATZ0681
R 589	A,C	CARBON RES. 1/6W J 330 Ω or	RCX6JATZ0331
	A,C	CARBON RES. 1/4W J 330 Ω	RCX4JATZ0331
R 590	A,C	CARBON RES. 1/6W J 220 Ω or	RCX6JATZ0221
	A,C	CARBON RES. 1/4W J 220 Ω	RCX4JATZ0221
R 591	A,C	CARBON RES. 1/6W J 330 Ω or	RCX6JATZ0331
	A,C	CARBON RES. 1/4W J 330 Ω	RCX4JATZ0331
R 592	A,C	CARBON RES. 1/6W J 220 Ω or	RCX6JATZ0221
	A,C	CARBON RES. 1/4W J 220 Ω	RCX4JATZ0221
R 593	A,B	CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
	A,B	CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 594	A,B	CARBON RES. 1/6W J 1.5k Ω or	RCX6JATZ0152
	A,B	CARBON RES. 1/4W J 1.5k Ω	RCX4JATZ0152
R 604		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
R 605		CARBON RES. 1/4W J 150 Ω	RCX4JATZ0151
R 606		CHIP RES. 1/10W J 47k Ω	RRXAJBBZ0473
R 607		CARBON RES. 1/6W J 100k Ω or	RCX6JATZ0104
		CARBON RES. 1/4W J 100k Ω	RCX4JATZ0104
R 608		CHIP RES. 1/10W J 1.8k Ω	RRXAJBBZ0182
R 609		CHIP RES. 1/10W J 1.8k Ω	RRXAJBBZ0182
R 610		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
R 611		CHIP RES. 1/10W J 1.2k Ω	RRXAJBBZ0122
R 612		CARBON RES. 1/6W J 1.5k Ω or	RCX6JATZ0152
		CARBON RES. 1/4W J 1.5k Ω	RCX4JATZ0152
R 628		CHIP RES. 1/10W J 10k Ω	RRXAJBBZ0103
R 630		CHIP RES. 1/10W J 10k Ω	RRXAJBBZ0103
R 631		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 634	B	CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
	B	CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103

Ref. No.	Mark	Description	Part No.
R 640	A,C	CHIP RES. 1/10W J 10k Ω	RRXAJBBZ0103
R 641	B	CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
	B	CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 642	A,C	CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
	A,C	CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 643	B	CHIP RES. 1/10W J 10k Ω	RRXAJBBZ0103
R 647		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 649		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 702		CARBON RES. 1/6W J 1.8k Ω or	RCX6JATZ0182
		CARBON RES. 1/4W J 1.8k Ω	RCX4JATZ0182
R 704		CARBON RES. 1/6W J 100 Ω or	RCX6JATZ0101
		CARBON RES. 1/4W J 100 Ω	RCX4JATZ0101
R 706		CARBON RES. 1/6W J 560k Ω or	RCX6JATZ0564
		CARBON RES. 1/4W J 560k Ω	RCX4JATZ0564
R 707		CHIP RES. 1/10W J 560k Ω	RRXAJBBZ0564
R 708		CARBON RES. 1/6W J 75 Ω (R708 Used only if TU701: NJH3091U001) or	RCX6JATZ0750
		CARBON RES. 1/4W J 75 Ω (R708 Used only if TU701: NJH3091U001)	RCX4JATZ0750
R 751		CHIP RES. 1/10W J 75 Ω	RRXAJBBZ0750
R 752		CHIP RES. 1/10W J 150 Ω	RRXAJBBZ0151
R 753		CHIP RES. 1/10W J 150 Ω	RRXAJBBZ0151
R 754		CHIP RES. 1/10W J 27k Ω	RRXAJBBZ0273
R 755		CHIP RES. 1/10W J 5.6k Ω	RRXAJBBZ0562
R 756		CHIP RES. 1/10W J 75 Ω	RRXAJBBZ0750
R 757		CHIP RES. 1/10W J 75 Ω	RRXAJBBZ0750
R 855	A,C	CARBON RES. 1/6W J 330 Ω or	RCX6JATZ0331
	A,C	CARBON RES. 1/4W J 330 Ω	RCX4JATZ0331
R 855	B	CARBON RES. 1/4W J 330 Ω	RCX4JATZ0331
R 856		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
R 857		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
R 858		CHIP RES. 1/10W J 1M Ω	RRXAJBBZ0105
R 552B		CARBON RES. 1/6W J 8.2k Ω or	RCX6JATZ0822
		CARBON RES. 1/4W J 8.2k Ω	RCX4JATZ0822
C 262		CARBON RES. 1/4W J 1k Ω	RCX4JATZ0102
C 267		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
C 268		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
C 269		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
C 270		CHIP RES. 1/10W J 1k Ω	RRXAJBBZ0102
J 9		CARBON RES. 1/4W J 1k Ω	RCX4JATZ0102
J 82		CARBON RES. 1/6W J 68k Ω or	RCX6JATZ0683
		CARBON RES. 1/4W J 68k Ω	RCX4JATZ0683
J 119		CARBON RES. 1/6W J 220k Ω or	RCX6JATZ0224
		CARBON RES. 1/4W J 220k Ω	RCX4JATZ0224
SWITCHES			
SW 501		TACT SWITCH KSM0614B or	SST0101HH013
		TACT SWITCH SKHHAP	SST0101AL028
SW 502		TACT SWITCH KSM0614B or	SST0101HH013
		TACT SWITCH SKHHAP	SST0101AL028
SW 503		TACT SWITCH KSM0614B or	SST0101HH013
		TACT SWITCH SKHHAP	SST0101AL028
SW 504		TACT SWITCH KSM0614B or	SST0101HH013
		TACT SWITCH SKHHAP	SST0101AL028
SW 505		TACT SWITCH KSM0614B or	SST0101HH013
		TACT SWITCH SKHHAP	SST0101AL028
SW 506		PUSH SWITCH SPPB61	SSP0102AL001
SW 701		SLIDE SWITCH SK12D07VG5-L A or	SSS0102LY003
		SLIDE SWITCH SK-12D01	SSS0102S9001
VARIABLE RESISTORS			
VR 501		CARBON P.O.T. 100k Ω B or	VRCB104KA011
		CARBON P.O.T. 100k Ω B(H) or	VRCB104HH009
		CARBON P.O.T. 100k Ω B	638A104
VR 701		CARBON P.O.T. 50k Ω B or	VRCB503KA011
		CARBON P.O.T. 50k Ω B(H) or	VRCB503HH009

Ref. No.	Mark	Description	Part No.
		CARBON P.O.T. 47k Ω B	638A473
		CRYSTTAL OSCILLATORS	
X 301		CRYSTAL OSCILLATOR 3.579545MHZ or	FXC355LA6001
		CRYSTAL OSCILLATOR 3.579545MHZ or	FXC355LGM001
		CRYSTAL OSCILLATOR 3.579545MHZ	1811389
X 502		CRYSTAL OSCILLATOR 32KHZ(10PPM) or	1811350
		CRYSTAL OSCILLATOR 32KHZ(10PPM)	1811351
		MISCELLANEOUS	
2B 1	A,C	HOLDER, L.E.D.	0VM201821
2B 2	B	HOLDER, L.E.E. 2	0VM407372
2B 3		HOLDER, JRC (B) (2B3 Used only if RS501: NJL61V367S and NJL51V367)	0VM408120
2B 7		SHIELD, HEAD B	0VM302979
2B 8		BUSH, LED(B)	6N50114
2B 9		CUSHION, LED	0VM408001
A 5		JACK BOARD(HI-FI)	0VM202013
AC 001 ⚠		AC CORD LA-1802	WAC0172LW003
CR 001 ⚠		CERAMIPEC 470pF 3.2-5.2M Ω	FAZ000LMR001
F 001 ⚠		FUSE 1A/250V	PAGG20CAG102
FH 001		FUSE HOLDER FH-V-03078-1	XH01Z00DK002
FH 002		FUSE HOLDER FH-V-03078-1	XH01Z00DK002
FIP 502	B	F.I.P. 4-MT-195G or	TVFD1C0FT030
	B	F.I.P. SVV-4SS05	TVFD1C0SM001
J 61		PCB JUMPER P10.0MM (J61 Used only if RS501: NJL61V367S and NJL51V367)	JW10.0
J 62		PCB JUMPER P5.0MM (J62 Used only if RS501: PIC-21042LU)	JW5.0
J 63		PCB JUMPER P10.0MM (J63 Used only if RS501: NJL61V367S and NJL51V367)	JW10.0
J 64		PCB JUMPER P5.0MM (J64 Used only if RS501: PIC-21042LU)	JW5.0
JK 751		RCA JACK JPJ4811-01-324 or	JXRL040HD002
		RCA JACK RJ-1096-59-030IA	JXRL040JD016
JK 752		RCA JACK RJ-1065-59-8000 or	JYRL060JD002
		RCA JACK JPJ5121-01-324 or	JYRL060HD009
		RCA JACK AV3-8,4-15A	JYRL060RP004
JK 753		RCA JACK(YELLOW) RJ-1066-04-1030 or	JXRL010JD015
		RCA JACK(YELLOW) JPJ2023-01-040	JXRL010HD014
JK 754		RCA JACK(WHITE) RJ-1066-03-1030 or	JXRL010JD014
		RCA JACK(WHITE) JPJ2023-01-030	JXRL010HD013
JK 755		RCA JACK(RED) RJ-1066-02-2030 or	JYRL010JD016
		RCA JACK(RED) JPJ1023-01-020	JYRL010HD006
JW 01		WIRE 050/BLA/AWG22#1007	WX3001A2FF05
JW 02		WIRE 060/BLA/AWG26#1007	WX3001A6FF06
PS 501		REEL SENSOR SG-231	PCZLAZZKK005
RS 501		REMOTE RECEIVER PIC-21042LU (Used J62 and J64)	USESJRSKK020
RS 501		REMOTE RECEIVER NJL61V367S (Used J61, J63 and 2B3) or	USESJRSJR011
		REMOTE RECEIVER NJL51V367 (Used J61, J63 and 2B3)	USESJRSJR009
SA 001 ⚠		SURGE ABSORBER ENC471D-10AC or	QVQZC471D10A
		SURGE ABSORBER JVR-10N471K	NVQZR10N471K
T 001 ⚠		PULSE TRANS A0700 S1497J	LTT00CPSA022
TP 301		PCB JUMPER D0.6-P7.5	JW7.5T
TP 302		PCB JUMPER D0.6-P12.5	JW12.5T
TP 501		PCB JUMPER D0.6-P10.0	JW10.0T
TP 503		PCB JUMPER D0.6-P15.0	JW15.0T
TP 504		PCB JUMPER D0.6-P6.0	JW6.0T
TP 701		PCB JUMPER D0.6-P10.0	JW10.0T
TP 751		PCB JUMPER D0.6-P10.0	JW10.0T
TU 701		TUNER UNIT NJH3091U001 (Used C711B and R708)	UTUNNTUJR001
TU 701		TUNER UNIT VA075AP (Used C711A) or	UTUNNTUSP007
		TUNER UNIT NJH3091U004 (Used C711A) or	UTUNNTUJR002
		TUNER UNIT TMLH2-009A (Used C711A)	UTUNNTUAL015

Function CBA (MCV-B)

Ref. No.	Mark	Description	Part No.
		Function CBA (MCV-B) Consists of the following:	———
		CONNECTOR	
CN 651		ANGLE SOCKET CONNECTOR, 3P	1770598
		RESISTORS	
R 653	A	CARBON RES. 1/6W J 1.5k Ω or	RCX6JATZ0152
	A	CARBON RES. 1/4W J 1.5k Ω	RCX4JATZ0152
R 654	A	CHIP RES. 1/10W J 2.2k Ω	RRXAJBBZ0222
R 655	A	CHIP RES. 1/10W J 3.9k Ω	RRXAJBBZ0392
R 656	A	CHIP RES. 1/10W J 8.2k Ω	RRXAJBBZ0822
R 657		CHIP RES. 1/10W J 2.2k Ω	RRXAJBBZ0222
R 658	B	CHIP RES. 1/10W J 3.9k Ω	RRXAJBBZ0392
R 659	B	CHIP RES. 1/10W J 8.2k Ω	RRXAJBBZ0822
R 660	B	CHIP RES. 1/10W J 22k Ω	RRXAJBBZ0223
R 671		CARBON RES. 1/4W J 1k Ω or	RCX4JATZ0102
		CARBON RES. 1/6W J 1k Ω	RCX6JATZ0102
R 672	B,C	CHIP RES. 1/10W J 1.2k Ω	RRXAJBBZ0122
R 673	B,C	CHIP RES. 1/10W J 1.5k Ω	RRXAJBBZ0152
R 674	B,C	CHIP RES. 1/10W J 2.2k Ω	RRXAJBBZ0222
R 675	B,C	CHIP RES. 1/10W J 3.9k Ω	RRXAJBBZ0392
R 676	B,C	CHIP RES. 1/10W J 8.2k Ω	RRXAJBBZ0822
R 692	A	CARBON RES. 1/6W J 1.2k Ω or	RCX6JATZ0122
	A	CARBON RES. 1/4W J 1.2k Ω	RCX4JATZ0122
		SWITCHES	
SW 652	A	TACT SWITCH KSM0614B or	SST0101HH013
	A	TACT SWITCH SKHHAP	SST0101AL028
SW 653	A	TACT SWITCH KSM0614B or	SST0101HH013
	A	TACT SWITCH SKHHAP	SST0101AL028
SW 654	A	TACT SWITCH KSM0614B or	SST0101HH013
	A	TACT SWITCH SKHHAP	SST0101AL028
SW 655	A	TACT SWITCH KSM0614B or	SST0101HH013
	A	TACT SWITCH SKHHAP	SST0101AL028
SW 656	A	TACT SWITCH KSM0614B or	SST0101HH013
	A	TACT SWITCH SKHHAP	SST0101AL028
SW 657	A	TACT SWITCH KSM0614B or	SST0101HH013
	A	TACT SWITCH SKHHAP	SST0101AL028
SW 658	B	TACT SWITCH KSM0614B or	SST0101HH013
	B	TACT SWITCH SKHHAP	SST0101AL028
SW 659	B	TACT SWITCH KSM0614B or	SST0101HH013
	B	TACT SWITCH SKHHAP	SST0101AL028
SW 660	B	TACT SWITCH KSM0614B or	SST0101HH013
	B	TACT SWITCH SKHHAP	SST0101AL028
SW 662	B,C	TACT SWITCH KSM0614B or	SST0101HH013
	B,C	TACT SWITCH SKHHAP	SST0101AL028
SW 665	B,C	TACT SWITCH KSM0614B or	SST0101HH013
	B,C	TACT SWITCH SKHHAP	SST0101AL028
SW 671		TACT SWITCH KSM0614B or	SST0101HH013
		TACT SWITCH SKHHAP	SST0101AL028
SW 673	B,C	TACT SWITCH KSM0614B or	SST0101HH013
	B,C	TACT SWITCH SKHHAP	SST0101AL028
SW 674	B,C	TACT SWITCH KSM0614B or	SST0101HH013
	B,C	TACT SWITCH SKHHAP	SST0101AL028
SW 676	B,C	TACT SWITCH KSM0614B or	SST0101HH013
	B,C	TACT SWITCH SKHHAP	SST0101AL028
SW 677	B,C	TACT SWITCH KSM0614B or	SST0101HH013
	B,C	TACT SWITCH SKHHAP	SST0101AL028

Hi-Fi Audio CBA (AFV)

Ref. No.	Mark	Description	Part No.
		Hi-Fi Audio CBA (AFV) Consists of the following:	0VSA08231
		CAPACITORS	
C 451		ELECTROLYTIC CAP. 10µF/16V M	CE1CMZPDL100
C 452		ELECTROLYTIC CAP. 10µF/16V M	CE1CMZPDL100
C 453		ELECTROLYTIC CAP. 0.1µF/50V M	CE1JMZPDL0R1
C 454		ELECTROLYTIC CAP. 4.7µF/50V M	CE1JMZPDL4R7
C 455		SEMICONDUCTOR CAP. SR K 0.01µF/25V or	12Y2103S
		SEMICONDUCTOR CAP. SR K 0.01µF/25V	CDA1EKS0X103
C 456		ELECTROLYTIC CAP. 10µF/16V M	CE1CMZPDL100
C 457		ELECTROLYTIC CAP. 220µF/6.3V M	CE0KMZPDL221
C 458		CERAMIC CAP.(AX) X K 4700pF/16V	CDA1CKT0X472
C 459		CERAMIC CAP.(AX) X K 3300pF/16V	CDA1CKT0X332
C 460		SEMICONDUCTOR CAP. SR K 0.015µF/25V or	12Y2153S
		SEMICONDUCTOR CAP. SR K 0.015µF/25V	CDA1EKS0X153
C 461		CERAMIC CAP.(AX) B K 100pF/50V or	CCA1JKT0B101
		CERAMIC CAP.(AX) B J 100pF/50V	CCA1JJT0B101
C 463		ELECTROLYTIC CAP. 22µF/16V M	CE1CMZPDL220
C 464		CERAMIC CAP.(AX) X K 3300pF/16V	CDA1CKT0X332
C 465		CERAMIC CAP.(AX) X K 4700pF/16V	CDA1CKT0X472
C 466		ELECTROLYTIC CAP. 220µF/6.3V M	CE0KMZPDL221
C 467		ELECTROLYTIC CAP. 10µF/16V M	CE1CMZPDL100
C 468		ELECTROLYTIC CAP. 4.7µF/50V M	CE1JMZPDL4R7
C 469		SEMICONDUCTOR CAP. SR K 0.01µF/25V or	12Y2103S
		SEMICONDUCTOR CAP. SR K 0.01µF/25V	CDA1EKS0X103
C 470		ELECTROLYTIC CAP. 0.1µF/50V M	CE1JMZPDL0R1
C 471		ELECTROLYTIC CAP. 10µF/16V M	CE1CMZPDL100
C 472		ELECTROLYTIC CAP. 10µF/16V M	CE1CMZPDL100
C 473		ELECTROLYTIC CAP. 10µF/16V M	CE1CMZPDL100
C 474		ELECTROLYTIC CAP. 0.22µF/50V M	CE1JMZPDLR22
C 475		CERAMIC CAP.(AX) B K 1000pF/50V or	CDA1JKT0B102
		CERAMIC CAP.(AX) B J 1000pF/50V	CDA1JJT0B102
C 476		ELECTROLYTIC CAP. 0.22µF/50V M	CE1JMZPDLR22
C 477		ELECTROLYTIC CAP. 0.22µF/50V M	CE1JMZPDLR22
C 478		CERAMIC CAP.(AX) B K 1000pF/50V or	CDA1JKT0B102
		CERAMIC CAP.(AX) B J 1000pF/50V	CDA1JJT0B102
C 479		ELECTROLYTIC CAP. 47µF/10V M	CE1AMZPDL470
C 480		CERAMIC CAP. F Z 0.022µF/50V	CCD1JZS0F223
C 482		ELECTROLYTIC CAP. 10µF/16V M	CE1CMZPDL100
C 483		ELECTROLYTIC CAP. 10µF/16V M	CE1CMZPDL100
C 484		ELECTROLYTIC CAP. 47µF/16V M H7	CE1CMZPSL470
C 485		CERAMIC CAP. F Z 0.022µF/50V	CCD1JZS0F223
C 486		ELECTROLYTIC CAP. 10µF/16V M	CE1CMZPDL100
C 951		ELECTROLYTIC CAP. 0.47µF/50V M	CE1JMZPDLR47
C 953		MYLAR CAP. 0.047µF/50V J or	CMA1JJP00473
		MYLAR CAP. 0.047µF/50V J	2254473
C 954		ELECTROLYTIC CAP. 4.7µF/25V M	CE1EMZPDL4R7
C 955		ELECTROLYTIC CAP. 4.7µF/25V M	CE1EMZPDL4R7
C 956		ELECTROLYTIC CAP. 3.3µF/50V M LL	CE1JMZPLL3R3
C 957		ELECTROLYTIC CAP. 1µF/50V M	CE1JMZPDL010
C 958		ELECTROLYTIC CAP. 10µF/16V M	CE1CMZPDL100
C 959		ELECTROLYTIC CAP. 4.7µF/35V M LL	CE1GMZPLL4R7
C 960		MYLAR CAP. 0.0027µF/50V J or	CMA1JJP00272
		MYLAR CAP. 0.0027µF/50V J	2254272
C 961		ELECTROLYTIC CAP. 47µF/16V M	CE1CMZPDL470
C 962		ELECTROLYTIC CAP. 0.47µF/50V M NP H7	CP1JMZPSBR47
C 964		CERAMIC CAP.(AX) X K 5600pF/16V	CDA1CKT0X562
C 965		CERAMIC CAP.(AX) X K 1200pF/16V	CDA1CKT0X122
C 973		ELECTROLYTIC CAP. 4.7µF/25V M	CE1EMZPDL4R7
C 977		ELECTROLYTIC CAP. 4.7µF/25V M	CE1EMZPDL4R7
J 488		CERAMIC CAP.(AX) Y M 0.01µF/16V	CDA1CMT0Y103
		CONNECTORS	
CN 456		ANGLE PIN HEADER, 12P	5700072
CN 457		ANGLE PIN HEADER, 15P	5700075
		DIODES	
D 451		SWITCHING DIODE 1N4148M or	NDTZ01N4148M
		SWITCHING DIODE 1N4148M or	QDTZ01N4148M
		SWITCHING DIODE GMB01-BT	GMB01BT
D 454		ZENER DIODE UZ-10BSB	QDTB00UZ10BS
		ICS	
IC 451		IC(HIFI) LA72603M	QSMLA0RSY027
IC 902		IC CXA1534S	QSBLA0SSN016
		TRANSISTORS	
Q 451		TRANSISTOR KTC3199(Y) or	NQSY0KTC3199
		TRANSISTOR KTC3199(GR) or	NQS10KTC3199
		TRANSISTOR KSC2785(Y) or	NQSY0KSC2785
		TRANSISTOR KSC2785(G) or	NQSG0KSC2785
		TRANSISTOR 2SC536SP(E) or	C536SEZ
		TRANSISTOR 2SC536SP(F)	C536SFZ
Q 951		RES. BUILT-IN TRANSISTOR KRC103M or	NQSZ0KRC103M
		RES. BUILT-IN TRANSISTOR KSR1203 or	NQSZ0KSR1203
		RES. BUILT-IN TRANSISTOR 2SC3400	C3400Z
		RESISTORS	
R 451		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 452		CARBON RES. 1/6W J 22k Ω or	RCX6JATZ0223
		CARBON RES. 1/4W J 22k Ω	RCX4JATZ0223
R 453		CARBON RES. 1/6W J 6.8k Ω or	RCX6JATZ0682
		CARBON RES. 1/4W J 6.8k Ω	RCX4JATZ0682
R 454		CARBON RES. 1/6W J 15k Ω or	RCX6JATZ0153
		CARBON RES. 1/4W J 15k Ω	RCX4JATZ0153
R 455		CARBON RES. 1/6W J 22k Ω or	RCX6JATZ0223
		CARBON RES. 1/4W J 22k Ω	RCX4JATZ0223
R 456		CARBON RES. 1/6W J 2.4k Ω or	RCX6JATZ0242
		CARBON RES. 1/4W J 2.4k Ω	RCX4JATZ0242
R 457		CARBON RES. 1/6W J 39k Ω or	RCX6JATZ0393
		CARBON RES. 1/4W J 39k Ω	RCX4JATZ0393
R 458		CARBON RES. 1/6W J 12k Ω or	RCX6JATZ0123
		CARBON RES. 1/4W J 12k Ω	RCX4JATZ0123
R 459		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 460		METAL FILM RES. 1/4W F 51k Ω	RMX4FATG0513
R 461		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 462		CARBON RES. 1/6W J 2.7k Ω or	RCX6JATZ0272
		CARBON RES. 1/4W J 2.7k Ω	RCX4JATZ0272
R 463		CARBON RES. 1/6W J 2.7k Ω or	RCX6JATZ0272
		CARBON RES. 1/4W J 2.7k Ω	RCX4JATZ0272
R 464		CARBON RES. 1/6W J 18k Ω or	RCX6JATZ0183
		CARBON RES. 1/4W J 18k Ω	RCX4JATZ0183
R 465		CARBON RES. 1/6W J 22k Ω or	RCX6JATZ0223
		CARBON RES. 1/4W J 22k Ω	RCX4JATZ0223
R 466		CARBON RES. 1/6W J 1k Ω or	RCX6JATZ0102
		CARBON RES. 1/4W J 1k Ω	RCX4JATZ0102
R 467		METAL FILM RES. 1/4W F 51k Ω	RMX4FATG0513
R 468		CARBON RES. 1/6W J 12k Ω or	RCX6JATZ0123
		CARBON RES. 1/4W J 12k Ω	RCX4JATZ0123
R 469		CARBON RES. 1/6W J 39k Ω or	RCX6JATZ0393
		CARBON RES. 1/4W J 39k Ω	RCX4JATZ0393
R 470		CARBON RES. 1/6W J 2.4k Ω or	RCX6JATZ0242
		CARBON RES. 1/4W J 2.4k Ω	RCX4JATZ0242
R 471		CARBON RES. 1/6W J 22k Ω or	RCX6JATZ0223
		CARBON RES. 1/4W J 22k Ω	RCX4JATZ0223
R 472		CARBON RES. 1/6W J 6.8k Ω or	RCX6JATZ0682

Ref. No.	Mark	Description	Part No.
		CARBON RES. 1/4W J 6.8k Ω	RCX4JATZ0682
R 473		CARBON RES. 1/6W J 15k Ω or	RCX6JATZ0153
		CARBON RES. 1/4W J 15k Ω	RCX4JATZ0153
R 474		CARBON RES. 1/6W J 22k Ω or	RCX6JATZ0223
		CARBON RES. 1/4W J 22k Ω	RCX4JATZ0223
R 475		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 476		CARBON RES. 1/6W J 22k Ω or	RCX6JATZ0223
		CARBON RES. 1/4W J 22k Ω	RCX4JATZ0223
R 477		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 478		CARBON RES. 1/6W J 5.6k Ω or	RCX6JATZ0562
		CARBON RES. 1/4W J 5.6k Ω	RCX4JATZ0562
R 482		CARBON RES. 1/6W J 22k Ω or	RCX6JATZ0223
		CARBON RES. 1/4W J 22k Ω	RCX4JATZ0223
R 483		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 484		CARBON RES. 1/6W J 2.7k Ω or	RCX6JATZ0272
		CARBON RES. 1/4W J 2.7k Ω	RCX4JATZ0272
R 485		CARBON RES. 1/6W J 4.7k Ω or	RCX6JATZ0472
		CARBON RES. 1/4W J 4.7k Ω	RCX4JATZ0472
R 486		CARBON RES. 1/6W J 1k Ω or	RCX6JATZ0102
		CARBON RES. 1/4W J 1k Ω	RCX4JATZ0102
R 487		CARBON RES. 1/6W J 12k Ω or	RCX6JATZ0123
		CARBON RES. 1/4W J 12k Ω	RCX4JATZ0123
R 489		PCB JUMPER D0.6-P5.0	JW5.0T
R 490		PCB JUMPER D0.6-P5.0	JW5.0T
R 493		CARBON RES. 1/6W J 330 Ω or	RCX6JATZ0331
		CARBON RES. 1/4W J 330 Ω	RCX4JATZ0331
R 494		CARBON RES. 1/6W J 10k Ω or	RCX6JATZ0103
		CARBON RES. 1/4W J 10k Ω	RCX4JATZ0103
R 951		CARBON RES. 1/6W J 4.7k Ω or	RCX6JATZ0472
		CARBON RES. 1/4W J 4.7k Ω	RCX4JATZ0472
R 952		CARBON RES. 1/6W J 7.5k Ω or	RCX6JATZ0752
		CARBON RES. 1/4W J 7.5k Ω	RCX4JATZ0752
R 953		CARBON RES. 1/6W J 750k Ω or	RCX6JATZ0754
		CARBON RES. 1/4W J 750k Ω	RCX4JATZ0754
R 954		CARBON RES. 1/6W J 47k Ω or	RCX6JATZ0473
		CARBON RES. 1/4W J 47k Ω	RCX4JATZ0473
R 955		CARBON RES. 1/6W J 47k Ω or	RCX6JATZ0473
		CARBON RES. 1/4W J 47k Ω	RCX4JATZ0473
R 957		CARBON RES. 1/6W J 56k Ω or	RCX6JATZ0563
		CARBON RES. 1/4W J 56k Ω	RCX4JATZ0563
R 960		CARBON RES. 1/6W J 3.9k Ω or	RCX6JATZ0392
		CARBON RES. 1/4W J 3.9k Ω	RCX4JATZ0392
R 961		CARBON RES. 1/6W J 3.3k Ω or	RCX6JATZ0332
		CARBON RES. 1/4W J 3.3k Ω	RCX4JATZ0332
R 962		CARBON RES. 1/6W J 43k Ω or	RCX6JATZ0433
		CARBON RES. 1/4W J 43k Ω	RCX4JATZ0433
R 963		CARBON RES. 1/6W J 1M Ω or	RCX6JATZ0105
		CARBON RES. 1/4W J 1M Ω	RCX4JATZ0105
R 964		CARBON RES. 1/6W J 100k Ω or	RCX6JATZ0104
		CARBON RES. 1/4W J 100k Ω	RCX4JATZ0104
R 967		PCB JUMPER D0.6-P5.0	JW5.0T
R 968		CARBON RES. 1/6W J 4.7k Ω or	RCX6JATZ0472
		CARBON RES. 1/4W J 4.7k Ω	RCX4JATZ0472
J 453		CARBON RES. 1/6W J 1k Ω or	RCX6JATZ0102
		CARBON RES. 1/4W J 1k Ω	RCX4JATZ0102
VARIABLE RESISTORS			
VR 451		CARBON P.O.T. 10k Ω B or	VRCB103KA011
		CARBON P.O.T. 10k Ω B(H) or	VRCB103HH009
		CARBON P.O.T. 10k Ω B	638A103
VR 452		CARBON P.O.T. 10k Ω B or	VRCB103KA011
		CARBON P.O.T. 10k Ω B(H) or	VRCB103HH009
		CARBON P.O.T. 10k Ω B	638A103

Ref. No.	Mark	Description	Part No.
VR 952		CARBON P.O.T. 20k Ω B or	VRCB203KA011
		CARBON P.O.T. 20k Ω B(H) or	VRCB203HH009
		CARBON P.O.T. 22k Ω B	638A223
VR 953		CARBON P.O.T. 20k Ω B or	VRCB203KA011
		CARBON P.O.T. 20k Ω B(H) or	VRCB203HH009
		CARBON P.O.T. 22k Ω B	638A223
VR 954		CARBON P.O.T. 5k Ω B or	VRCB502KA011
		CARBON P.O.T. 5k Ω B(H) or	VRCB502HH009
		CARBON P.O.T. 4.7k Ω B	638A472
VR 955		CARBON P.O.T. 10k Ω B or	VRCB103KA011
		CARBON P.O.T. 10k Ω B(H) or	VRCB103HH009
		CARBON P.O.T. 10k Ω B	638A103

DECK PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

Note: Parts that not assigned part numbers (----------) are not available.

Tolerance of Capacitors and Resistors are noted with the following symbols.

C.....±0.25%	D.....±0.5%	F.....±1%
G.....±2%	J.....±5%	K....±10%
M.....±20%	N.....±30%	Z.....+80/-20%

Ref. No.	Description	Part No.
ACH281	ACE HEAD(MK6) HVMXA0014A	DHV3A03AL007
B 1	CHASSIS ASSEMBLY MK6	0VSA08139
B 2	CYLINDER ASSEMBLY(MK6) NTSC 4HD HIFI	N6067CYL
	or	
	CYLINDER ASSEMBLY(MK6) NTSC 4HD HIFI	0VM302780
B 3	LOADING MOTOR ASSEMBLY MK6	0VSA08112
B 4	MOTOR HOLDER MK6	0VM407676
B 5	CASSETTE DRIVE LEVER CALKING ASSEMBLY MK6	0VSA08219
B 8	PULLEY ASSEMBLY MK6	0VSA08132
B 9	MOVING GUIDE S PREPARATION MK6	0VSA08228
B 10	MOVING GUIDE T PREPARATION MK6	0VSA08229
B 11	LOADING ARM T ASSEMBLY MK6	0VSA08135
B 12	LOADING ARM S ASSEMBLY MK6	0VSA08134
B 13	LOADING LEVER ASSEMBLY MK6	0VSA08138
B 15	LUMIRROR WASHER 3.1X6X0.35	0VM403269
B 21	LOADING BELT MK6	0VM407712
B 27	TENSION LEVER ASSEMBLY MK6	0VSA08128
B 31	AC HEAD ASSEMBLY MK6	0VSA08124
B 32	REEL BASE ASSEMBLY MK6 T	0VSA08236
B 35	TAPE GUIDE ASSEMBLY MK6	0VSA08127
B 37	CAPSTAN MOTOR F2QTB30 or	MMDZB12SJ003
	CAPSTAN MOTOR VC7725 or	MMDZB12KJ002
	CAPSTAN MOTOR	N9610CML
B 38	MODE LEVER MK6	0VM202000
B 46	TAPE GUIDE ARM SPRING MK6	0VM407704C
B 47	TAPE GUIDE ARM ADJUST SCREW	0VM403242
B 51	FF ARM MK6	0VM407669A
B 52	CAPSTAN BELT (2) MK6	0VM408223
B 53	P.S.W B	0VM402625
B 54	SPRING PLATE ASSEMBLY	0VSA08140
B 73	FE HEAD(MK6) HVFHP0005A	DHVEC01AL003
B 74	PRISM MK6	0VM302723
B 81	M LEVER HOLDER MK6	0VM302711D
B 86	F BRAKE ASSEMBLY MK6	0VSA08143
B 108	P.S.W F	0VM402629
B 121	WORM MK6	0VM407662
B 122	P.S.W C	0VM402626
B 123	P.S.W (WORM THRUST)	0VM403348
B 126	PULLEY MK6	0VM407661
B 132	CLUTCH ASSEMBLY MK6	0VSA08320
B 133	IDLER ASSEMBLY MK6	0VSA08136
B 142	SHAFT LOCK ASSEMBLY MK6	0VSA04642
B 144	CLUTCH WASHER MK2	0VM404428
B 145	MAIN LEVER ASSEMBLY MK6	0VSA08117
B 148	TG CAP (2) MK4	0VM406389B
B 300	FL ASSEMBLY MK6	0VSA08101
B 302	RACK (2) MK6	0VM302167B
B 303	FRONT DOOR OPENER MK6	0VM302730
B 304	DOOR OPENER MK6	0VM302729
B 308	SLIDER SHAFT MK6	0VM407693H
B 313	C. DRIVE GEAR SPRING MK6	0VM407698A

Ref. No.	Description	Part No.
B 316	DOOR LOCK RELEASE ARM SPRING	0VM402508C
B 317	DOOR LOCK RELEASE ARM(3) MK3	0VM405034D
B 319	CASSETTE SPRING MK6	0VM407984
B 329	HOLDER KICK ARM JOG SHUTTLE MK3 or	0VM301979D
	HOLDER KICK ARM(2) JOG SHUTTLE MK3	0VM302219B
B 332	HOLDER ARM SPRING MK6	0VM408062B
B 339	REEL BASE ASSEMBLY MK6 S	0VSA08235
B 344	CASSETTE GUIDE R MK6	0VM100640C
B 345	CASSETTE GUIDE L MK6	0VM100639B
B 346	FRONT GUIDE MK6	0VM302726B
B 347	GUIDE HOLDER F MK6	0VM302736
B 348	GUIDE HOLDER R MK6	0VM302737D
B 350	SLIDER GEAR MK6	0VM407673
B 351	MIRROR MK6	0VM407713
B 352	CASSETTE DRIVE GEAR MK6	0VM302728C
B 353	CASSETTE PLATE SUB ASSEMBLY MK6	0VSA08217
B 354	SLIDER R MK6	0VM202003E
B 355	SLIDER L MK6	0VM202002C
B 356	LOCK LEVER MK6	0VM302731C
B 357	LOCK LEVER L SPRING MK6	0VM407796
B 358	CAM MK6	0VM100638
B 365	RADIATOR PLATE 2	0VM408106
B 403	ACH-9A MK6	0VM302725
B 404	ACH-9B MK6	0VM407672
B 405	P.S.W 1.7X3.2X0.5T	0VM403678
B 406	SENSOR GEAR MK6	0VM407668
B 407	M GEAR MK6	0VM407666A
B 408	PRISM T MK6	0VM407670B
B 409	EJECT SPRING MK6	0VM407700A
B 410	PINCH ROLLER ASSEMBLY MK6	0VSA08113
B 411	PINCH SPRING MK6	0VM407702B
B 412	S BRAKE LEVER ASSEMBLY MK6	0VSA08118
B 413	M BRAKE T ASSEMBLY MK6	0VSA08119
B 414	M BRAKE S ASSEMBLY MK6	0VSA08120
B 415	S BRAKE LEVER SPRING MK6	0VM407699B
B 416	M BRAKE T SPRING MK6	0VM407705B
B 417	T LEVER SPRING MK6	0VM407706
B 418	TENSION PLATE MK6	0VM407809B
B 419	BT ARM MK6	0VM302721C
B 420	REC ARM MK6	0VM302720C
B 421	REC ARM SPRING MK6	0VM407708
B 425	LOCK LEVER SPRING MK6	0VM407755
B 426	KICK PULLEY MK6	0VM407663B
B 427	KICK SPRING MK6	0VM407701
B 428	P.S.W 1.7X3.2X0.5T	0VM403678
B 429	EJECT SPRING B MK6	0VM407961
B 431	LDG PLATE MK6	0VM408077
B 432	SLIDER WASHER MK6	0VM408078
B 435	F BRAKE SPRING MK6	0VM407707
2B 6	DECK GROUNDING PLATE MK6	0VM407975
2L051	SCREW, C-TIGHT M3X5 BIND HEAD+	GBMS3050
L 1011	SCREW, C-TIGHT M3X9 PAN HEAD+	GPMC3090

Ref. No.	Description	Part No.
L 1051	SCREW, S-TIGHT M2.6X6 PAN HEAD+	GPMS9060
L 1053	SCREW, S-TIGHT M2.6X6 PAN HEAD+	GPMS9060
L 1061	SCREW:SPRING PLATE MK6	0VM407914
L 1062	SCREW, S-TIGHT M2.6X8 PAN HEAD+	GPMS9080
L 1063	SCREW, S-TIGHT M2.6X4 PAN HEAD+	GPMS9040
L 1081	SCREW, S-TIGHT M3X6 BIND HEAD+	GBMS3060
L 1101	SCREW, P-TIGHT 3X10 BIND HEAD+	GBMP3100
L 1114	SCREW, P-TIGHT M2X6 WASHER HEAD+	GCMP2060
L 1151	SCREW, SEMS M3X4 PAN HEAD +	CPM33040
L 1191	SCREW, P-TIGHT M2.6X12	GCMP9120
L 1321	SCREW, P-TIGHT 3X8 BIND HEAD+	GBMP3080
L 1341	SCREW, P-TIGHT M2.6X8 BIND HEAD+	GBMP9080
L 1402	SCREW, P-TIGHT M2X6 WASHER HEAD+	GCMP2060
L 1403	SCREW, P-TIGHT 3X10 WASHER HEAD+	GCMP3100
L 1406	SCREW, S-TIGHT M2.6X4 CUP HEAD+	GCMS9040
L 1407	SCREW, S-TIGHT M2.6X8 PAN HEAD+	GPMS9080
L 1408	SCREW, S-TIGHT M2.6X6 PAN HEAD+	GPMS9060
L 1412	SPACER SCREW MK6	0VM40807I
L 1420	SCREW, P-TIGHT 3X8 BIND+	GBMP3080

Mode SW CBA (SWV)

Ref. No.	Description	Part No.
B 422	Mode SW CBA (SWV) Consists of the following:	0VSA08142
	CONNECTOR	
CL 281	PARALLEL WIRE 2P AWG26/GREY/UL2651	WX1N6002-003
R 281	CARBON RES. 1/4W G 3.6K OHM	RCX4GATZ0362
R 282	CARBON RES. 1/4W G 1.5K OHM	RCX4GATZ0152
R 283	CARBON RES. 1/4W G 10K OHM	RCX4GATZ0103
R 284	CARBON RES. 1/4W G 22K OHM	RCX4GATZ0223
R 285	CARBON RES. 1/4W G 470 OHM	RCX4GATZ0471
SW 281	MODE SWITCH HMW0420-910010 or	SSR0104HD004
	MODE SWITCH SSS-27MD	SSR0104KB002

Memo:

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